Entomologist's Gazette

An Illustrated Quarterly Journal of British Entomology

1960
Volume 11

Publisher & Business Manager:
E. W. CLASSEY.

Editor:
J. D. BRADLEY.

Assistant Editors:
A. E. GARDNER and W. H. T. TAMS.

Published by E. W. CLASSEY, F.R.E.S., 22 HARLINGTON ROAD EAST,
FELTHAM, MIDDLESEX,
ENGLAND

LIST OF CONTRIBUTORS

Printed by KENION PRESS LTD *Slough, Bucks*

Entomologist's Gazette

January, 1960 Vol. 11, No. 1

CONTENTS

Price 10/6

ENTOMOLOGIST'S GAZETTE

January, 1960. Vol. 11, No. 1.

Publisher & Business Manager:
E. W. CLASSEY

Editor:
J. D. BRADLEY

Assistant Editors:
A. E. Gardner and W. H. T. Tams.

ENTOMOLOGIST'S GAZETTE is a Quarterly publication devoted to British Entomology. Papers and Communications should be sent to THE EDITOR, 53 Osterley Road, Isleworth, Middlesex. The Annual Subscription is £2 2s. (£1 16s. if paid by the end of January) and should be sent to *ENTOMOLOGIST'S GAZETTE*, 22 Harlington Road East, Feltham, Middlesex, England. Subscriptions can be accepted only for the whole year, commencing with the January number. Advertising enquiries should also be sent to this address.

NEWS AND VIEWS

Mr. A. E. Gardner, F.R.E.S., who has given so much service to *Entomologist's Gazette* for so long announces his retirement from the Editorship (although his name has appeared with mine as Co-Editor, he has done the entire editorial work himself for the last four or five years). This retirement has been forced on Mr. Gardner by a steady increase in his business commitments, and I am personally very sorry to lose the devoted service he has given the *Gazette* and wish to thank him most sincerely for all the hard work he has put into the job.

Fortunately we shall not miss him entirely, as he has consented to continue as Assistant Editor together with Mr. W. H. T. Tams, A.L.S., and all matter for Subscribers' Notices should be sent to him.

Our Editor will be Mr. J. D. Bradley, F.R.E.S., and I shall continue as Publisher and Business Manager.

We have every reason to believe that this arrangement will work well and that we shall be able to catch up with the delays in publication which have unfortunately occurred during the last two years or so.

I feel that I must also thank all subscribers for their support and forbearance. Although we have had many enquiries when issues have been seriously delayed we have never had a single grumble.

E. W. Classey.

H. D. SWAIN—AN APPRECIATION

Humphrey Drummond Swain was born in June, 1902, and was educated at St. Columba's, Ireland, and at Brighton College.

He graduated as Master of Arts at Oriel College, Oxford, and taught Physics at several Public Schools before going to St. Paul's in September, 1924, to stay for thirty-five years, proving a most popular master, helped no doubt by his wide range of interests, for he was a good pianist and musician, a very keen photographer, a most accomplished artist, and last but by no means least a very keen naturalist and entomologist.

In his last years he started illustrating insects and in this time did some of the finest work ever seen and a prodigious amount, making a wonderful contribution to science and providing illustrations which will be used for identification for decades to come.

This started quite by chance. He obtained from me one of the very rare red butterflies of the genus *Prepona*, with which I was reluctant to part. With his characteristic generosity he turned up a few days later with a beautiful painting of this as a memento. On seeing this I immediately begged him to paint the British Butterflies, and these were then published on one large folding chart. This was followed by the cover of Watkins & Doncaster's catalogue. I then introduced him to Messrs. Frederick Warne & Co., and there followed his beautiful paintings of British Birds' Eggs in the *Observer* series, and in the larger works in the *Wayside and Woodland* series he did the magnificent paintings for the 'Land and Water Bugs', the 'Grasshoppers', and finally the illustrations for the new colour plates in the revised 'South's Moths'.

Although he saw proof plates of these works, some of which have been shown at scientific meetings, he did not see them published, as he died suddenly of a heart attack on 15th September, 1959.

H. D. Swain was on the advisory panel of the *Entomologist's Gazette* since its beginning. His most important work in this journal was the illustrated paper on the Waved Black Moth (*Parascotia fuliginaria* L.) (*Ent. Gaz.*, **1**: 186. 1950), which revealed his ability as a field worker.

At the present moment his first entomological paintings—those for the butterfly chart—are being prepared for the new edition of *Observers'* Butterflies.

H. D. Swain was a quiet, unassuming man, always ready to listen and to give help and advice to others, and he will be much missed by his many entomological friends, but the very great loss that Science has suffered will not be apparent to all until the books containing his superb illustrations are all published.

R. L. E. FORD.

FIRST RECORD OF *CALLOPISTRIA JUVENTINA* CRAMER (LEP., NOCTUIDAE) IN BRITAIN

On the 16th May, 1959, Mr. Summers and I visited Laughton Woods, Sussex. Upon arrival the weather did not appear to be at all favourable, with clear skies and rapidly falling temperature due to a stationary ridge of high pressure centred over the country. There did not appear to be much on the wing at dusk and rather despondently we switched on our mercury vapour lamp; the temperature at that time was about 65 deg. F. The object of our trip was to obtain *Apatele alni* L., only one of which was caught.

The evening was slow, numbers being few. At approximately 10.30 p.m. our enthusiasm was aroused by the sudden appearance of a moth which we could not identify. We decided it was probably a rather pale specimen of *Actinotia polydon* Cl., and not until the Annual Exhibition of the South London Entomological and Natural History Society in October was the species identified for certain by Mr. W. H. T. Tams as *Callopistria juventina* Cram.

J. GREEN.

6 The View,
Abbey Wood, London, S.E.2.

[This species occurs in Central and Southern Europe, ranging eastwards through China and Korea to Japan. The larva feeds by day on the underside of the fronds of Bracken (*Pteris aquilina*) in August and September and passes the winter full grown in a cocoon, pupating in the spring. It apparently has two or more colour-forms, and is green, with reddish or whitish subdorsal crescents and a yellowish or whitish lateral line sometimes edged with pink, and a reddish head.—Ed.]

A CONFUSED HUMMING-BIRD HAWK-MOTH (*MACROGLOSSUM STELLATARUM* L.)

In a very good year for this species I should like to report on one strange observation I made. I captured a very nice male specimen indoors on the 13th October which was attracted to the coloured lights (red, blue, green and yellow) on a control panel of a piece of electronic equipment. The moth was hovering in front of them with its proboscis extended as if it were trying to obtain nectar. This is the first time I have ever heard of or seen moths fooled in this way.

T. R. L. BIGGER.

Rush Common House,
Abingdon, Berkshire.

AN INFLUX OF THE HUMMING-BIRD HAWK-MOTH IN 1959

An article by Dr. Maurice Burton on the Humming-Bird Hawk-Moth (*Macroglossum stellatarum*) appeared in the *Daily Telegraph* on Saturday, 3rd October, 1959. It apparently coincided with one of the largest migrations of this moth to reach the British Isles for several years past. Nearly a hundred readers of Dr. Burton's article wrote to him with accounts of having seen Humming-Bird Hawk-Moths. Some idea of the extent and size of the migration can be gathered from the fact that these letters, which Dr. Burton kindly showed me, come from all parts of England as far north as Cumberland, Wales, the Isle of Man and Ireland.

Below is a list of the counties with localities and dates extracted from the letters. A few mention the moths having been seen in July, but the vast majority give the end of September and beginning of October. Most of the letters were written between the 3rd and 6th of October, on or soon after the actual days the moths were observed, and it therefore does not follow that none were seen after the dates given.

ENGLAND

KENT: Dover, Sept 22 and 24; Tunbridge Wells, end Sept to Oct 3; Hawkinge, Oct 6. SUSSEX: Eastbourne, Oct 3; Pevensey Bay, Sept 20 approx.; Brighton, Oct 1; Worthing, end Sept; Hove, end Sept; Selsey, Oct 4; Hassocks, Oct 2. HANTS.: Emsworth, Oct 1; Brockenhurst, Oct 3. DORSET: Wimbourne, Sept 29; Corfe Castle, Sept 25 to Oct 3. DEVON: Tavistock, end Sept to Oct 3; Saunton, July; Exmouth, Oct 3. CORNWALL: East Looe, end Sept; Mawgan Porth, Sept 8, a swarm of Humming-Bird Hawk-Moths and Silver-y Moths (*Plusia gamma*) appeared at dusk, last Humming-Bird Hawk seen Oct 16; Paignton, end Sept, Oct 10 and Oct 28. ESSEX: Clacton-on-Sea, Sept 20 to Oct 3; Chigwell, end Sept; Brentwood, Oct 2; Great Chesterfield, Sept 20 to Oct 3; Burnham-on-Crouch, Sept 6; Upminster, Sept; E. Woodford, Sept 20; Saffron Walden, end Sept to Oct 12. SUFFOLK: Ixworth, Sept; Woolpit, Sept 30; Bury St. Edmonds, Oct 2. NORFOLK: Market Weston, end Sept; Gt. Walsingham, Oct 1. HUNTS.: Spaldick, Sept 20 onwards. CAMBS.: Cambridge, Oct 1 to 5; Chatteris, end Sept to Oct 10. HERTS.: Hitchin, Oct 2. SURREY: Worplesdon, end Sept to Oct 3. BERKS.: Cookham Dean, end Sept to Oct 3; Wantage, Oct 2. WILTS.: Salisbury, Oct 3. SOM.: Wells, end Sept to Oct 4; Yeovil, Oct 1 to 4; Chard, Oct 2; Winscombe, end Sept. GLOS.: Chipping Campden, Sept, common; Painswick, Sept 26; Minchinhampton, end Sept to Oct 4. OXON.: Oxford, Oct 2; Great Tew, Oct 1 to 3. SALOP: Madeley, Sept 20 and Oct 3; All Stetton, Oct 3 and Oct 7. NORTHANTS.: Benfield, Oct 6; Peterborough, Oct 17. WORCS.:

Evesham, Sept 25; Gt. Malvern, Sept 29; Hanley Castle, Sept 20 to Oct 3. HEREFORDS.: Leominster, end Sept; Eardisley, Oct 6. LEICS.: Leicester, Sept 28; Loughborough, early Sept. STAFFS.: Wolverhampton, Oct 1 to 7. LINCS.: Alford, Oct 1; Bourne, Oct 3; Gainsborough, early Sept and late Sept; Grantham, Nov 1. YORKS.: York, end Sept to Oct 3; Sinnington, Oct 4; Goole, Oct 3; Gothland, Sept 13. LANCS.: Barrow-in-Furness, Oct 2; Scotforth, mid July, Oct 3 to 5. WESTMORLAND: Arnside, Oct 5; Windermere, Oct 6. CUMB.: Carlisle, July, Oct 1.

WALES

MON.: Lydart, Oct 2. GLAM.: Cardiff, Sept 24. DENBIGH.: Wrexham, end Sept.

ISLE OF MAN: Oct 4, common.

IRELAND

CO. KILDARE: Newbridge, early Oct.

J. D. BRADLEY.

DUNGENESS—THE NATURE CONSERVANCY'S DECISION

In November, 1959, the Nature Conservancy announced that the proposed Dungeness National Nature Reserve had been abandoned, as the Conservancy feels that their limited resources can be better employed elsewhere now that the intended area has been so much reduced by the Government's recent consent to the building of a nuclear power station there. The Conservancy will endeavour to preserve as much of the flora and fauna as possible on the ground not compulsorily purchased by the Central Electricity Board, and this area is designated as a Site of Special Scientific Interest, and shown as such on the Kent County Development Plan. The Conservancy is willing to support the Royal Society for the Protection of Birds, and also local societies in their conservation plans, and intends to keep in close touch with the Electricity Board and their contractors as the work progresses so that the minimum amount of harm is done.—*Ed.*

---

100 YEARS AGO

From *The Entomologist's Weekly Intelligencer,* Saturday, 14th January, 1860.

OBITUARY

We regret to announce the decease of William Spence, Esq., the well-known joint author of Kirby & Spence's 'Introduction to Entomology'. Mr. Spence expired on 6th inst., at his residence, No. 18 Lower Seymour Street, Portman Square, aged seventy-seven. Though of late years, owing to his increasing deafness, Mr. Spence abstained from attending the social *réunions* of entomologists, his interest in his favourite Science continued unabated to the last, and his loss will long be felt by all who had the pleasure of his acquaintance.

A TECHNIQUE FOR MOUNTING SIPHONAPTERA, MALLOPHAGA, AND ANOPLURA

By WILLIAM F. RAPP, JNR.
Entomologist, Nebraska State Department of Health, Lincoln, Nebraska, U.S.A.

One needs only to refer to such handbooks as *The Microtomist's Vade-Mecum* to realize how much has already been published on micro techniques. However, in spite of the voluminous literature, only a small portion has been devoted to whole-mount techniques. For the past several years we have been trying various methods for the mounting of ectoparasites. Our object was to find or develop a technique which was: (1) Easy, (2) Fast, (3) Simple, and (4) Provide us with good permanent mounts. We feel that the following technique gives us the mounted specimens which fulfil the objectives set forth above.

The specimens are collected and stored in 70% alcohol. The specimens are cleared in 10% potassium hydroxide. The clearing is done in a water bath heated to 50° C. and should clear for at least five hours. After clearing, the specimens are washed in 1% acetic acid and then placed in 70% alcohol and allowed to remain at least one hour. They are then transferred to 95% alcohol and allowed to remain at least one hour. Specimens are cleared in Beechwood creosote for one hour. The specimens are transferred to a watch glass containing xylol and mounted in Synthetic Resin.

DISCUSSION

Our experience has shown that 70% alcohol is a satisfactory method of storing specimens until they are ready to be mounted. Some workers feel that the addition of 1% glycerin produces better specimens, but we have not seen any marked improvement. Either sodium hydroxide or potassium hydroxide may be used as a clearing agent. We have found that by holding the specimens at 50° C. while clearing, the action is speeded up and that there is no distortion. The same degree of clearing can be obtained by allowing the specimens to remain in the caustic solution for 24 hours at room temperature. One of the most important steps is the washing of the specimens in the 1% acetic acid solution, and it is essential that all traces of the caustic solution be removed if good mounts are to be made. One of the features of this technique is that specimens may be held in 70% alcohol, 95% alcohol or Beechwood creosote for longer than the recommended time without detrimental results. Beechwood creosote is used as a clearing agent as it clears instantaneously, even in watery preparations. Because of the chitinous exoskeleton no shrinking due to exosmosis has been observed in the mounted specimens.

Since 1954 we have been mounting our specimens by the method as outlined above and find that they have remained in good condition.

A STANDARD LOCALITY CARD

By D. H. SMITH, F.R.E.S.

Recording can be both a pleasure and a bane to the naturalist with limited time at his disposal. The object of this paper is an attempt to make this very necessary adjunct to work in the field as concise and yet as detailed as possible with a minimum of writing needed. Collectors vary in their method of keeping notes from pieces of paper, through bound books to filing cards, with combinations of all three. The author is concerned here only with the last mentioned.

The two main ways of recording on filing cards or by any other means are, firstly, under the heading of individual species (species cards), and, secondly, under geographical regions (locality cards).

The species card takes one species and notes all the localities where the creature is found together with other relevant data such as host plant, date, finder, numbers present, etc. There are many varieties of species cards, among which may be noted the straightforward 5 in. x 3 in. or 6 in. x 4 in. ruled card, with entries in ink, a specially printed card with the various details coded for compactness (*e.g.* The Botanical Society cards) or a printed map with distribution shown by dots. All these methods serve the same purpose.

The locality card, however, takes one locality and records all the species of a particular group found within its boundaries. The scale of the locality can vary, but the limiting factors which will decide the scale from the individual collector's point of view may well be the number of cards which would be involved and the use to which the cards may be put.

The author believes that both systems should go hand in hand, the one complementing the other as the information which the two would supply together is enormous. Entries should be made on both cards at the same time. Either system will of course provide almost identical information (except that the dates will be lacking in locality cards). However, if one wished to investigate the insect community of Box Hill, for example, using species cards alone, it means that every single card has to be separately handled and scanned and each entry under Box Hill noted down. An analogous situation occurs in reverse when using locality cards only.

The great difficulty in designing a locality card for insects lies in the large number of species in some of the orders and the impossibility of writing all the names on one or even a small number of cards. With over 20,000 known insects in the British Isles, two individual orders of which contain over 5,000 species some other method must be applied. The locality card which is here proposed uses numbers to identify the species, and by this means a maximum of 2,229 different species may be recorded on one card.

The use of numbers implies a printed list and this is where some standardization is necessary. In the case of Lepidoptera we are amply

provided for by Heslop's excellent list with its supplements. For the other insect orders it is suggested that we turn to Kloet & Hincks' Check List (1945). It is not necessary that every species be numbered but only those at the head of each column and excluding synonyms, varieties, sub-species, etc., except where the true species is not represented in the country. As there are 737 such columns, excluding Lepidoptera, the whole numbered list could be contained in three sheets of foolscap, using one side of the paper only for easy reference. Intermediate species numbers would be determined by counting down, and each order would commence with number 1. New species can be prefixed by a letter and numbered in the amended list from A.1 upwards. Therefore each locality will only need one extra card to accommodate new species, since it is unlikely that over 2,000 new species will be discovered in one locality.

The problem which arises when considering orders with more than 2,220 species might be overcome by the following method:

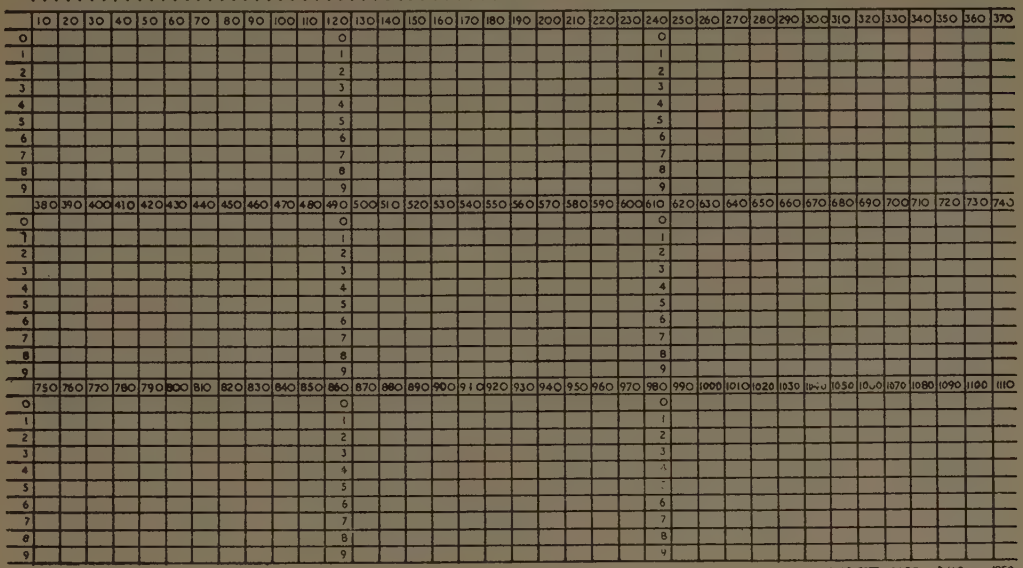
Coleoptera could be split into three sets of cards: Staphylinoidea, Rhynchophora and the remaining superfamilies, each set numbering from one upwards.

The Hymenoptera might well be dealt with in the various sub-orders and superfamilies as summarized in Kloet & Hincks, except for the Ichneumonoidea. If the Ichneumonidae are treated as a group the remaining numbers fall within the scope of one card.

Similarly Diptera Orthorrhapha could be split into the two superfamilies Nematocera and Brachycera.

It is hoped that if these cards prove acceptable, a means will thereby be provided for the rapid interchange of information between entomologists. Two or more persons who frequent a particular area and are interested in the same orders can exchange cards with each other from time to time. If one person's card be placed over the other's, providing that each is using the same scale, and a sheet of carbon paper placed between, then by pressing down over the appropriate places all one's information can be transferred to the other card and vice versa. These additions to one's own records can be filled in in a different way and provision is made on the top of the card for coding these. This provision also enables the recorder to extract information from journals, magazines and standing collections, etc., and be able at a later date to check back on the source of the information. It is also possible to transfer details from a small scale locality card by the previously mentioned means on to a large scale card, but not the reverse. A collector could therefore, at any time, prepare a master card for a county using the small scale cards in an hour or so. See Fig. 2.

The check list being used should be entered on the card as also the place where this is normally kept, in the unfortunate event of the premature demise of the recorder. Ample room is left under the heading of habitat to provide detailed information from an ecological

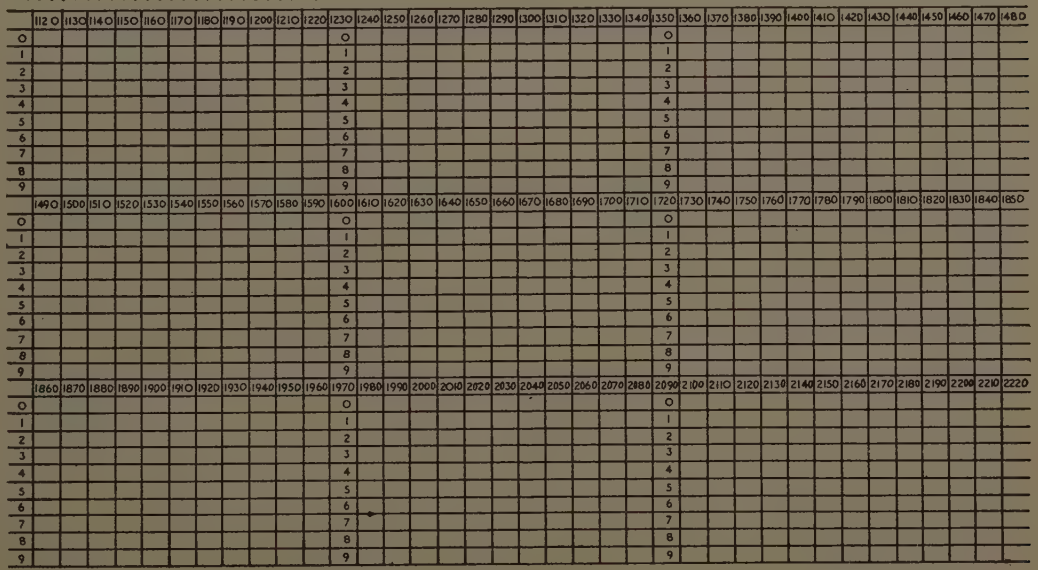


A STANDARD LOCALITY CARD.

Fig. 1. Obverse side, actual size.

ORDER/FAMILY etc. ..... CHECK LIST .....

SOURCE OF RECORDS ..... HOUSED .....



A Standard Locality Card.

Fig. 2. Reverse side.

viewpoint. The more field workers using similar means of recording in this way, the greater the pooling of individual information with relatively little extra work. See Fig. 1.

The continued reference to filing cards does not imply that this is the ultimate in recording, merely that it is very convenient and compact. Books, either bound or loose leaved can show identical information, if necessary, in more detail than might be possible on a filing card.

SUMMARY

The advantages of the proposed scheme are as follows:

1. A standard printed card of this nature provides a concise method of recording a large number of species in a small space.
2. Every single species can be recorded, not just probables.
3. The card enables a rapid exchange of information between groups of specialists.
4. The method is applicable to any group of living things from insects and plants to birds and animals, and even to geological specimens provided that a standard numbered list is available which can be added to from time to time.

The disadvantages are:

1. Errors may be made in finding the number.
2. The practicability of numbering little worked suborders or families. Errors, however, creep into any written work; the danger here is merely greater.

The author would particularly welcome comments, suggestions and criticisms of the proposed card, especially with reference to the provision of numbering the species. A number of these cards are already being printed for a pilot scheme over a selected area and would be available for anyone interested. The cost will partly depend on the number of cards required, but should be in the region of 3s. to 4s. per 50. A duplicated numbering system tentatively based on the check list previously mentioned is also available on request, but this can be amended in the light of further comment. It may be felt that the Check Lists of Species prepared by the Royal Entomological Society of London for some of the groups would be more convenient.

It is hoped to publish further details of the scheme after considering correspondence received, which should be addressed to:

D. H. Smith, F.R.E.S., 'Somerdale', Welton Road, Brough, Yorks.

RECENT LITERATURE

Handbooks for the Identification of British Insects. Vol. VII. Part 2. (*ai*). **Hymenoptera Ichneumonoidea Ichneumonidae,** key to sub-families and **Ichneumoninae**—I. By J. F. Perkins. 27th October, 1959. pp. 116. Illust. Wrappers. *Roy. ent. Soc. Lond.* Price £1 5s.

As a Lepidopterist the thing which struck me about this publication was the lack of reliable host records and records which could be certainly attributed to the parasite species. This is in part due to the uncertainty of the identification of the Hymenoptera in the published records, but it does seem that there is an opportunity for interesting and valuable work by Lepidopterists. If reared material from reliably identified hosts could be preserved and passed on to the British Museum (Natural History) collections it could greatly aid future work. In the present age, when the accumulation of a collection of Lepidoptera has been rendered, in the main, much easier by the use of Mercury Vapour Light there must be many Lepidopterists looking for fruitful applications for field work. Lepidopterous larvae for this purpose must, of course, be collected in the field—and carefully segregated if the records are to be of any value.

It is surprising to learn that there are nearly 2,000 species of Ichneumonidae recorded from the British Isles—and that it is by far our largest family of insects.

This Handbook should certainly stimulate the study of such a large and neglected group.

E.W.C.

HELIOTHIS ARMIGERA (HÜBN.) IN BRITAIN (LEP., CARADRINIDAE)

A three-quarters grown larvae of *H. armigera* was given me to-day by my greengrocer, Mr. H. Gillingham. It was feeding on the fruit of Canary Islands tomatoes.

This is the beginning of the season for the import of tomatoes from the Canaries and it is worth while keeping a look out for larvae of *H. armigera.*

I am convinced that it is a fairly common arrival, as few years pass without Mr. Gillingham giving me several larvae (see *Ent. Gaz.* **8**: 192-3, 1957).

The probability is that the vast majority of larvae are destroyed before they can come to the notice of the customer.

The present larva has been photographed in colour by Mr. J. D. Bradley and sent to Mr. G. Haggett for figuring.

E. W. CLASSEY.

Feltham, Middlesex.
21st November, 1959.

NOTES ON SOME EAST ANGLIAN MOTHS—1959

After drawing a blank during the past two wet years I was pleased to get to grips with *A. extrema* Hübn. at Wood Walton Fen, in Huntingdonshire; it was well out over the week-end of 12th-13th June and continued into early July, but as with all members of this group it is as well to go early to catch them as soon as they are out. I found the moths to change their habits almost daily; one evening they would be flying freely well before dusk, the next hardly one would be seen before it was truly dark, while on other nights there might be a steady trickle throughout the period. I was glad of the chance to get eggs and see how they hatched within a fortnight.

On 22nd June I went by night to Barton Broad, in Suffolk, and found the larvae of *A. brevilinea* Fenn to be extremely common, though local along the fen edge where the reeds are regularly cut over. The larvae were mostly in the last instar and feeding at the upper leaves.

During the past few years I have been getting to know the habits of *A. fluxa* Hübn. pretty well, so I was rather surprised to find them emerging freely at Mildenhall in Suffolk on 11th July instead of the usual time at the end of the month; it was most abundant this year and I worked it hard for a fortnight, getting them absolutely fresh and in an astonishing range of colour forms that included shades of deep salmon, as well as the silky cream and bone-white hues.

At Barton Broad on 12th July *P. muscerda* Hufn. was out and I saw a good patch of *Scirpus* attacked by *N. algae* Esp., with one three-quarters grown larva changing its stem. Larvae of *P.machaon* L. were in all stages of growth and frequent enough without my searching for them.

The earliest date I have this year for the larvae of *P. sagittata* Fab. is 29th July, and they went on for exactly a month, while Mr. Day told me he knew of several found a further ten days after that; they were locally plentiful, and now they have become so well known at Wood Walton perhaps the Norfolk sites will benefit from a rest. During late August and for much of September the larvae of *A. sparsata* Treits. were numerous on *Lysimachia,* but some sites very heavily parasitized. *M. flammea* Curt. was fully fed much earlier than usual; I found some on 29th August, and by 3rd September there were not many about—being some three weeks earlier than recent years.

C. absinthii L. has been taken recently at such widely separated parts of Norfolk as Wells and Stoke Ferry, and to those records I can add Bury St. Edmunds in Suffolk, having beaten three larvae out of Mugwort (*Artemisia*) there on 30th August. The same plants yielded a lot of *E. succenturiata* L. a few weeks later, but these were nearly all stung.

Larvae of *C. berberata* Schiff. were common on 30th August at Bury, though still rather small, and when I visited the spot again on 9th September I found much of the Barberry (*Berberis*) hedges had been burned; they had suffered even further by 20th September, but there were still larvae about. It is an exceedingly variable species at full growth, some being quite golden, and I had one totally black.

Back in the fens on 10th September the larvae of *E. trisignaria* H.-S. were in profusion, feeding even on the blackened withered *angelica* heads, where they were much darker green but still very conspicuous.

On 12th September I collected some larvae of *E. extensaria* Frey. along the north Norfolk coast, but I was a bit late and could find only a few although the tips of the *Artemisia* were well eaten in some places.

C. ocellaris Borkh. is now known to have a wide, almost complete distribution over East Anglia, but I was still pleased to see a moth at Brandon, Suffolk, on 17th September. *A. pygmina* Haw. was emerging there and during the next week I collected a good series of the two principal colour forms.

Moths were very numerous on ivy blossom at Bury during September and best form the subject of a separate note.

G. HAGGETT.

MOTHS AT IVY BLOSSOM, BURY ST. EDMUNDS—1959

Just out of Bury St. Edmunds, in Suffolk, there is a mile run of low flint wall that abounds with ivy which this year came sweetly into bloom during the last fortnight of September and attracted a fair sample of the moths of the neighbourhood.

The commonest species were *P. meticulosa, A. circellaris* and *A. litura*; other very plentiful noctuids were *C. vaccinii, E. transversa, A. puta, T. pronuba, A. c-nigrum, O. lunosa, A. glareosa, L. pallens, A. macilenta, C. clavipalpis* and *A. segetum,* some of the last being extraordinarily large.

Amongst the late summer species still hanging on there were *A. xanthographa, L. fimbria, T. comes, H. micacea, H. proboscidalis, H. trifolii* and *A. pyramidea.*

X. fluctuata and *D. truncata* were the only geometers.

Of the Sallows *T. aurago* was the scarcest, about a dozen, *C. gilvago* was the commonest, with *T. citrago* next, but only a few each of *C. icteritia* and *C. lutea.*

There were eight *L. semibrunnea* and a similar number of *A. lutulenta, G. ornitopus, A. lota* and *C. ligula*; while *A. helvola, D. protea, A. flavicincta* and *G. aprilina* were represented only by two or three examples.

A. ipsilon was the most numerous of the migrant species, with *P. gamma* and the occasional *P. porphyrea,* many *N. noctuella* and a good few *U. martialis* (= *ferrugalis*). G. HAGGETT.

LITHOPHANE LEAUTIERI BOISDUVAL IN DORSET (LEP., NOCTUIDAE)

By B. R. BAKER AND R. W. PARFITT

It was with thoughts of *Eumichtis lichenea* Hübn. and *Dasypolia templi* Thünb. rather than of *Lithophane leautieri* Boisd. that we arranged to caravan at Swanage from 1st-4th October, 1959. We had both seen good growths of *Heracleum sphondylium* on the cliffs earlier in the year and the chances of seeing *templi* seemed good.

By four o'clock on 1st October we had crossed by the Sandbanks-Studland ferry and spent a short while re-exploring the Little Sea area before moving on to Swanage. The boot of the car was loaded with two generators and the usual electrical equipment, plus a Robinson trap which we hoped to operate from a plug-in point. Our host at the caravan site was extremely helpful. Not only did he give us access to a lighting point, but also informed the police and coast-guard that for three nights a bright light would be visible on the cliffs.

We ran out 130 yards of heavy cable from our lighting point, taking the lead close to the cliff edge where numerous *Vanessa atalanta* L. were fluttering over the ivy bushes in warm sunshine and so to a flat piece of rock looking out over the bay. The light was on by 7 p.m. and, noting that the slight wind was coming from a southerly direction, we left the trap to do its job and departed for Portland.

That night innumerable moths came to our two mercury vapour lamps, one situated on the cliff top, the other 150 yards down a steep path. To the topmost light came many *Aporophyla nigra* Haw. and *Leucania l-album* L., also several female *Eumichtis lichenea* Hübn. Around midnight many male *lichenea* of the beautiful pale Portland form arrived together with *Aporophyla australis* Boisd. The lower lamp attracted mainly *Leucochlaena hispida* Gey., but *l-album, lichenea* and *australis* came in smaller numbers. One *Leucania albipuncta* Fabr. and one *templi* came to this lower lamp just before 11 p.m. A friendly policeman arrived soon after midnight and chatted whilst we were busy at the lamps, and moths were still coming in freely when we left for Swanage at 2 a.m.

The trap on the cliffs was the sign of great activity; many moths were inside it and many more, including two *Herse convolvuli* L. were found on the rock ledges near by. We retired for the remainder of the night having first boxed several *templi* and *lichenea* from these ledges.

The following morning brought the first surprise—one *Lithophane leautieri* Boisd. was found neatly hidden in a rock fissure close to the trap. *Templi* and *lichenea* proved to be common, and other arrivals included one *Laphygma exigua* Hübn., one *Caradrina ambigua* Fabr. and two *Margaronia unionalis* Hübn. During the

morning we searched for available stands of *Cupressus macrocarpa* but without success.

That night we tried one light on the cliff top 150 yards from the trap and with plenty of intervening screening by vegetation. Few moths of note except one *Nycterosea obstipata* F. came to this light, but on visiting the sheets in the early hours we saw two apparently large hawkmoths flitting back and forth in the glare. We then discovered that the nets and all the large boxes were back at the trap site, but the situation was eased when the two *Whitethroats* could be better observed. Nets and boxes were fetched, however, and soon afterwards two genuine *convolvuli* settled in quick succession on the sheets.

Next morning a female *Lithosia quadra* L. was found sitting quietly on the choke—near by was a female *albipuncta,* and inside the trap was a male of the same species. One *Vanessa atalanta* L. and many wasps were also present, together with many of the previously expected moths.

Even though we were able to set a number of insects during the day, the relaxing box position became rather urgent, and on a shopping expedition into the town we searched diligently for *Prunus Lauro-cerasus* bushes. These seemed to be non-existent in Swanage and we had to make do with freshly-damped sand from the beach. We did however find some *macrocarpa* trees and received ready permission from the owner to put a lamp in his grounds that night.

The generator was installed late in the afternoon. Some little trouble was taken siting it, ensuring at the same time that the exhaust was not aimed at near-by houses, and in this moving back and forth we found our *Lauro-cerasus,* a few tiny stragglers left from a recently felled shrubbery.

With some anticipation we put down a considerable area of sheeting on ground as flat as a tennis court and started the generator. Little came for the first hour except a number of *Thera obeliscata* Hübn. At the trap site an east wind was keeping the number of arrivals down, but back in the cypresses even *obeliscata* had no trouble in floating down. At eight o'clock the first *leautieri* arrived. Soon afterwards another moth, appearing from manner of approach very similar to *leautieri,* went down in the carpet of dead leaves close by and was never rediscovered. At 9 p.m. we assumed the dusk flight to be well over, and having filled the petrol tank to capacity and made a house of egg boxes around the lamp we returned to our caravan. At midnight we were back in the cypresses but no *leautieri* were on the sheets or in the egg-house. Until 1.30 a.m. the time was passed in cutting up laurel leaves—a lengthy process and one not usually undertaken at this hour.

The time of activity of *leautieri* was not known to us, except that it was said to take place very late. We therefore decided to run the generator all night and returned to fill the tank at 3 a.m.

At this hour moths were certainly arriving at the sheets. We observed five *leautieri* arrive between 3 and 3.30 a.m. Five *unionalis* and a number of excellent *lichenea* were also found at this period resting in and around the egg-boxes.

A last visit was paid to the site at 6.30 a.m. to cut the engine, examine the trap and remove all signs of our activity. In the trays was one more *leautieri*. We would suggest that a few hours spent watching a lamp sited in available cypress groves at other places along the coast might well reveal that *leautieri* is already in residence in many more places than at the moment is generally supposed.

---

100 YEARS AGO

From *The Entomologist's Weekly Intelligencer,* Saturday, 16th June, 1860.

Lost Property

To the Editor of the 'Intelligencer'

Sir,—I observe, from last Saturday's *Intelligencer,* that there is to be a great gathering of entomologists at Reigate, at the invitation of Mr. Saunders, on Friday, the 22nd inst.

At the similar gathering last year I had the misfortune to lose my cap and stick, which were placed in a corner of the ante-room before dinner, and were not forthcoming afterwards. I presume some entomologist took them by mistake for his own, and did not afterwards like to admit having made such a blunder (after dinner).

Though entomological boxes have long been considered *common property,* I am not aware that caps and sticks have ever been viewed in that light. The stick exactly fits my net, and is therefore of more value to me than to the gentleman who walked off with it.

Should this meet the eye of the gentleman who now has my cap and stick, I should be very glad if he would replace them, on Friday, the 22nd, in the very corner of the room whence they were abstracted; in which case the absent appropriator will have eased his conscience, I should recover my property, and *no questions would be asked.*

Hoping you will be able to find a corner for this communication in the next number of the *Intelligencer.*

I am, Sir,

Your most obedient servant,

Senex.

11th June, 1860.

SOME NEW ABERRATIONS OF BRITISH RHOPALOCERA

By A. L. GOODSON

The following aberrations are in the Rothschild-Cockayne-Kettlewell collection in the British Museum:

Melitaea athalia Rott. ab. *postfuscofasciata* ab. nov.

On the underside of the hindwings the colour of the prominent yellowish white median band is replaced by leaden grey, leaving only a thin edging of normal colour on each side.

Type ♀: Blean Woods, 9.vii.1941, J. Shepherd.

Coenonympha tullia Müller ab. *sagittata* ab. nov.

On the underside of the forewings the white transverse stripe is considerably broadened and rayed outwards along the veins towards the margin to form a series of five very large sharp wedges. The white is also extended outwards on the hindwings but in a less conspicuous manner.

Type ♂: Inverurie, Scotland, vi.1910, L. W. Newman.

Coenonympha tullia Müller ab. *annulonulla* ab. nov.

On the underside the yellowish rings, which surround the spots of both fore and hindwings in normal specimens, are absent, leaving only small rather suffused black spots, completely altering the appearance of the species. The small apical spot of the forewings has a tiny white pupil, but of the chain of six spots on the hindwings only two are faintly pupilled.

Type ♂: Mainland of Orkney, vii.1950, S. B. Hodgson.

Maniola tithonus L. ab. *albinotica* ab. nov.

Albino. All black patterning replaced by silver grey.

Type ♀: Blean, Kent, vii.1897.

Maniola tithonus L. ab. *depupillata* ab. nov.

On the underside all white spots or pupils are absent. The large black apical spot of the forewings, normally containing two white pupils, is blind and the usual white spots of the hindwings, varying from two to six in number, are completely absent, there being three blackish suffused spots in place of them. The apical spot of the forewings is also blind on the upperside.

Type ♂: Near Ashford, Kent, 18.vii.1934, H. Wood.

Colias hyale L. ab. *albinotica* ab. nov.

Albino. All black patterning is replaced by very pale silvery lilac grey, the pink fringes showing in contrast. A very good figure of this insect is given by Frohawk in Nat. Hist. British Butterflies, 1914, pl. 9, f. 26.

Type ♂: Sheerness, 1.ix.1901, F. W. Frohawk.

Carterocephalus palaemon Pallas ab. *albinotica* ab. nov.

Albino. All the dark markings replaced by pale brownish grey, the ground colour normal.

Type ♂: Brampton Wood, Northants, 21.v.1932, T. S. Robertson.

British Museum, Tring.

LEPIDOPTERA AT PORTLAND IN OCTOBER, 1959

By E. W. CLASSEY AND ROBIN MERE

We had planned to pay a short visit to Cornwall early in October, but business commitments prevented us. So, as some small consolation, we went to Portland, Dorset, for the night of 4th October. We drove down from London in the morning, the first day of 'winter time', and a lovely warm sunny day it was. We bought second crop strawberries from a roadside stall, and hoped this foretold unusual second broods among the moths.

As we approached the coast the wind freshened, and at Portland there was a strong easterly wind, but remarkably enough it was a warm wind. This warmth we liked, but not the wind's direction, because we had decided to collect on the east side of the Isle of Portland, which we found was fully exposed to the wind.

We obtained permission to plug-in a light-trap to a chalet near the cliff edge. By placing the trap on a piece of lawn between two chalets some shelter was gained.

At dusk we started the portable generator and ran a 125 w. mercury vapour lamp in a sheltered corner of a quarry. No moths were seen on the wing at dusk, and half an hour's vigil near the lamp produced one *Plusia gamma* L. (Silver Y) and one *Antitype flavicincta* Schiff. (Large Ranunculus). Leaving the generator running we visited ivy blossom, of which there was a large quantity. A good number of moths were seen: *Eumichtis lichenea* Hübn. (Feathered Ranunculus), *Omphaloscelis lunosa* Haw. (Lunar Underwing), *Agrochola lychnidis* Schiff. (Beaded Chestnut), *Aporophyla nigra* Haw. (Black Rustic), *Phlogophora meticulosa* L. (Angle Shades), and *Nomophila noctuella* Schiff. After a while we returned to the lamp in the quarry and there found a *Margaronia unionalis* Hübn. sitting, quite inconspicuously, on a rock near the lamp. A *Leucochlaena hispida* Gey. (Beautiful Gothic) was caught flying near the lamp, but that was all. Ivy was obviously much more rewarding, so we stopped and packed up the generator.

A visit to the trap plugged-in at the chalet produced another *hispida*. Ivy blossom produced one *Lencania l-album* L. (L-album Wainscot) and an *Agrotis segetum* Schiff. (Turnip Moth) in addition to the species previously found at ivy, and also one *unionalis*. We found several *Acleris boscana* Fabr. in a lighted porch. By this time it was nearly 9 p.m., and we had a leisurely and very excellent dinner, improved by a bottle of wine. After dinner a number of *hispida* and a few *l-album* were taken flying near the cliff face, perhaps attracted by our hand lamps. Ivy produced nothing fresh except one *Dysstroma truncata* Hufn. (Common Marbled Carpet).

The next morning we were out at the mercury vapour trap before half-past six. There were some 30 insects in the trap, and perhaps 200 in the short grass near the trap. One of the first insects found

in the grass was a male *Leucania unipuncta* Haw. (White Speck Wainscot), quickly followed by two *unionalis*. There were great numbers of *lichenea* and *noctuella*, many *l-album*, and among the other insects seen were *hispida, nigra, Triphaena comes* Hübn. (Lesser Yellow Underwing), *T. pronuba* L. (Large Yellow Underwing), *Agrotis ipsilon* Hufn. (Dark Swordgrass), *Larentia clavaria* Haw. (Mallow), and *Udea martialis* Hübn.

A further visit to Portland was much to be desired in view of the one *unipuncta* and four *unionalis* taken in this one night. R.M.M. was unable to get away the following week-end, but E.W.C., accompanied by Ian Lorimer, spent the night of 11th October at Portland. On this occasion no portable generator was taken, but two m.v. traps were plugged-in to chalets. There was a south-west wind, stronger than was liked, but the east side of Portland was fairly sheltered, and it was warm. Again an *unionalis* was taken at ivy blossom, but no species were seen at ivy in addition to those seen on the previous visit. A visit to the m.v. traps before dinner produced the commoner species seen at light the previous week-end, and also one *Dasypolia templi* Thunb. (Brindled Ochre) and one *Rhizedra lutosa* Hübn. (Large Wainscot). Again an excellent dinner was improved by a bottle of wine. A comfortable, mellow and lazy feeling ensued. There really seemed no point in revisiting the traps before going to bed, the catch would be there in the morning. Fortunately enthusiasm prevailed.

By one of the traps, on its back, lay a moth. It was boxed and looked at—it was none other than a fine fresh male *Trigonophora flammea* Esp. (Flame Brocade).

We believe this is the fourth specimen of this rare insect found in England this century. It was a tremendous surprise, one of those events that really lives in one's memory, and compensates for the many disappointments that are the normal lot.

The *flammea* was taken back to London and photographed alive by Mr. J. D. Bradley. It twice escaped while the photography was in process, flying vigorously round the ceiling lamp, it being after dark, and those present nearly suffered from heart attacks every time the *flammea* seemed likely to disappear behind a piece of furniture or damage itself on the hot lamp. However, all was well, and it was eventually killed and set, perfect except for slight damage to the fringe of one forewing.

But to return to Portland: there were hopes the next morning for more surprises. There was a surprise too, but not one that had been hoped for. During the night the wind had backed to the east, there had been heavy rain, and there was nothing in or near the traps except a few soaked and battered moths.

We wondered whether *flammea* had by good fortune re-established itself, or whether the specimen taken was no more than a casual migrant. We were determined to try to find out. This meant further

visits to Portland. But we were able to go only once more, for the night of 18th October. On the 17th there was a gale. Many trees were blown down, and on our way to Portland we had to make a detour where the road was blocked by a fallen tree. When we reached Portland it was still blowing very hard, though no longer a gale. The wind continued all night, and it seemed impossible to get out of it.

We arrived at Portland prepared to run m.v. traps again from the chalets. To our dismay we found that the electric supply to the chalets had been cut off for the winter. With some difficulty we found two alternative plug-in points. The trap from one was unsheltered, and we found but three moths in it. The trap from the other was sheltered in a wood, but we could not light up until after 10 p.m. because the electric cable crossed a path in use until then.

We found a quarry partly out of the wind and sugared. Not a single moth came. A few insects were seen at ivy. Some 50 or 60 moths in all were seen at the more sheltered trap, some near midnight and others in the morning, including *lichenea, hispida* and *l-album,* and one *Peridroma porphyrea* Schiff. (Pearly Underwing). We also found one more *unionalis* sitting some five feet above ground level on the upper side of a sycamore leaf. We had sugared this tree, but the moth was not near the sugar. It is of course possible that it had been disturbed by our approach and flown off the sugar patch to the leaf.

Considering the weather we did well. It was not a fair test for *flammea* and no conclusion could be drawn from our failure to take a second specimen. Perhaps we shall find out next year.

RECENT LITERATURE

Proceedings and Transactions of the South London Entomological and Natural History Society for 1958. (Published October, 1959.) pp. xlv; 158, 9 plates (2 coloured), 23 text Figs. Wrappers. Price £1.

The usual excellent standard of this annual publication is well maintained by this volume for 1958. The main contents of interest to the non-member are: The address by the President (Dr. N. E. Hickin), *The British Anobiidae*; *Larvae of the British Lepidoptera not figured by Buckler, Part III,* by G. Haggett; *Experimental Variation in Aricia agestis* Schiff., by F. V. L. Jarvis; *The Style of the House,* by F. D. Buck; and *Africa Revisited,* by Dr. C. G. M. de Worms.

Mr. Haggett's paper carries on his excellent series with two plates in colour illustrating the larvae of *Nonagria neurica* Hübn., *Nonagria algae* Esp., *Coenobia rufa* Haw.,*Hydrillula palustris* Hübn., *Caradrina ambigua* Schiff., and *Acosmetia caliginosa* Hübn.

The title of Mr. Buck's paper hides an extremely informative and interesting paper on the preparation of scientific papers for publication. It includes notes on nomenclature, abbreviations, construction of Keys, illustrations, recommended treatment of authors' names, methods and symbols used in correcting proofs, and many other useful notes. This paper is worthy of study by all persons writing papers (not merely the novice!).

The value of this annual volume is impossible to exaggerate and membership of the Society is well worth while for this alone, apart from the other advantages.

For intending members it may be worth while to note that information concerning membership may be obtained from the Society at *Pepys House,* 14 *Rochester Row, London, S.W.*1

E.W.C.

BOOK REVIEW

Land and Water Bugs of the British Isles, by T. R. E. Southwood and D. Leston. (Wayside and Woodland Series.) London and New York, 1959. Frederick Warne & Co. Ltd. 12 x 17 cms. pp. xi; 436. 32 coloured plates by H. D. Swain; 31 black-and-white plates by P. and H. M. Entwistle. Cloth. Price £1 10s.

The publication of a new handbook of the British Hemiptera-Heteroptera is quite an event in entomological circles, for there has been nothing of the kind for over sixty years. Such an interval of time has, of course, seen many advances in our knowledge of this group of insects, and there has been a most noticeable upsurge of interest in the post-war years. Obviously, then, the present little volume fills an acute and long-felt need—and let it be said at once, it fills it very well indeed. From the outset it is clear to the reader that the authors really know their bugs and the literature dealing with them. Armed with their book, any new enthusiast who is prepared to undertake the necessary field-work should soon find himself in a similar position.

The book contains fourteen chapters, three appendices and a general index. The first chapter gives a very brief introduction to the sub-order, together with a key to the families and a list of reference works. The 509 known British species, as well as several foreign adventives, are then treated individually, family by family, in succeeding chapters. Good illustrated keys to species are provided, together with much interesting biological and distributional data. Chromosome numbers (where known) are also given—an unusual feature in a work of this kind, and there are impressive lists of references to original literature. However, no statistics are cited for the world Heteroptera as a whole, so the beginner will be unable to gauge how representative or otherwise is the British fauna in the various groups. The appendices comprise notes on collecting and studying bugs, a glossary, and a list of plants with their associated

species. The illustrations are very fine and the drawings of whole insects give an accurate impression of the species they depict. The coloured reproductions, too, are very life-like, although they can hardly do full justice to the beautiful paintings from which they were taken.

The authors' style is rather terse, doubtless in keeping with the highly factual nature of their book. Surprisingly, they have extended the hitherto very limited number of vernacular names applicable to bugs. Some of the new names are apt or even picturesque, but others sound a little trite, and their utility seems debatable in such a group as this, where so many of the species, small and obscure, are unlikely ever to come to public notice. Errors and misprints are few and mostly of little consequence, although the definition of pH, given in the glossary (page 414) as 'the hydrogen-ion concentration', will not pass muster.

This book is a veritable mine of information on our native bugs. Up-to-date and very good value at its price, it should appeal to entomologists and general naturalists alike. Certainly, no hemipterist could afford to be without a copy.

B. P. MOORE.

---

100 YEARS AGO

From *The Entomologist's Weekly Intelligencer,* Saturday, 4th February, 1860.

ACCOMMODATION FOR THE ENTOMOLOGICAL SOCIETY

Sir,—In your paper read before the Anniversary Meeting mention was made of the inconvenience and frequent headache experienced by the members of the Entomological Society, in consequence of the insufficient size of the room appointed for their meetings, and the increasing number of the attending members. I have not heard any complaints made of the insufficient accommodation of the Society's rooms for their books, cabinets, &c., but only those respecting the nights of the Society's meetings, which occur thirteen times in the year.

I believe that on three nights in every week the South Kensington Museum is open gratuitously to any Society; I should propose, therefore, that the Society's rooms remain at Bedford Row, but that the meetings should be held in the South Kensington Museum, where there is ample accommodation for every entomologist in Great Britain, and far greater attractions to catch stray country members, who now seldom, if ever, look us in the face.

The plan will doubtless meet with objections from those who live near Bedford Row, and therefore I hope you who live far off will advocate the scheme. It has its objections I grant, but it is much less objectionable than the present scheme.

Yours, &c.,

23 Bedford Place. A. WALLACE, M.B.

A NOTE ON THE LARVAL ECDYSIS OF *STAUROPUS FAGI* L. (LEP., NOTODONTIDAE)

By T. G. HOWARTH

Dept. of Entomology, British Museum (Natural History)

In late summer 1959 Mr. J. O. T. Howard kindly gave me a dozen third instar larvae of *Stauropus fagi* L. (Lobster Moth) bred from ova laid by a female he took in the New Forest earlier in the year, and I have twice been fortunate enough to witness the last larval moult. The only recorded observations of this moult that I can trace are those of Buckler in his monumental work *Larvae of British Butterflies and Moths* (1886), and as my observations differ radically in some respects they may be worth recording here.

The first occasion was on 27th August, when a larva was noticed in its penultimate instar and had remained quiescent for about two days, in preparation for its final moult. It was resting normally, with the frontal end towards the tip of the birch twig on which it was clinging and with the head raised far over the back so that it was nearly touching the anal segment which itself was raised in the same way, and with the thoracic legs folded tightly so that they projected in front of the head. Just after mid-day, at 12.11 p.m., the larva suddenly began a series of slow pulsations or contractions rather as if it was trying to walk very slowly within its own skin. These contractions and relaxations were timed and rated at approximately twelve per minute, and while these body movements were taking place it was noticed that the meso- and metathoracic legs were unfolded slightly and partly crossed and uncrossed in unison with the pulsations. These continued for sixteen minutes until 12.27 p.m., when the larva lowered its head sharply so that the thoracic and first two abdominal somites were projecting rigidly at approximately forty-five degrees from the birch twig. It was then noticed that the skin had split behind the head and was beginning to retract. At 12.29½ p.m. the prothoracic legs were freed and the old head capsule was still in position. Meanwhile the two old pairs of unusually long meso- and metathoracic legs remained partly extended and at right angles to the body, while their new counterparts were pressed close to the ventral surface of the abdomen as they were slowly withdrawn. They were not freed until the third dorsal hump and first pair of prolegs on the third abdominal segment were released at 12.32 p.m. It was noticed during this period that, as the exuviae moved back on the side observed uncovering the meso- and metathoracic segments, the old lining of the prothoracic spiracle was pulled out and appeared as a coarse white thread between five and seven millimetres in length. The head capsule was dislodged about this time when the larva wriggled violently. At 12.33½ p.m. the second pair of abdominal

prolegs were freed, at 12.34 p.m. the third, and a half minute later the fourth pair were freed. The larva completed its ecdysis in nine minutes at 12.36 p.m. It then raised its head and the long thoracic legs were thrust forward until nearly fully extended so that they hung limply in front of the head, their tips twitching slightly. It remained motionless in this attitude except for a slight trembling of the legs until 12.40, when it suddenly whipped round to touch or clean the last few abdominal segments with its mandibles or maybe to rub its head; it then resumed its former attitude until 1.2 p.m., when it folded its thoracic legs into their normal resting position and pushed its head still further back until it nearly touched the last abdominal segment but slightly to one side. Two and a half hours later it was seen to be busily engaged in eating its exuviae, this probably after the mouth parts had become sufficiently hardened.

The second larva observed began its contractions at about 9.30 a.m. on 3rd September. These continued for fifty minutes until 10.20 a.m., when it was noticed that the first pair of abdominal prolegs had moved up inside the old skin, which still remained clasped to the twig. At approximately 10.22 a.m. the skin must have been ruptured but was not noticed until the prothoracic legs were freed at 10.24 a.m. Three minutes later at 10.27 a.m. the femora of the meso- and metathoracic legs were visible lying along the ventral surface of the first two abdominal segments. As the exuviae moved back the first pair of abdominal prolegs were freed and it was then seen that the long thoracic legs were lying between the latter, and as the larva struggled it appeared to be walking up its own legs until finally at 10.20 a.m. the thoracic legs were freed just at the same moment as the second pair of abdominal prolegs. At 10.31 a.m. the old head capsule was pushed or fell off with no apparent effort, two and a half minutes later the remaining prolegs had been freed and the larva completed its ecdysis at 10.35, having taken fourteen minutes. After resting awhile with the thoracic legs thrust forward as the first two abdominal segments. As the exuviae moved back the first bending its head right back and either rubbing it on the last segment or cleaning this segment. It was most difficult to decide exactly what the larva was doing as the whole operation or movement only lasted a few seconds. After this the larva settled down once more until 11.8 a.m., when it folded its legs into the normal resting attitude. At 2.15 p.m. it was seen eating part of the exuviae.

Time in minutes	1st larva	2nd larva	Buckler's larva
Observed period of contractions	16	50	60
Actual time for shedding skin	9	14	75
From completion of ecdysis to folding of thoracic legs	27	33	—
From completion of ecdysis to eating of exuviae	150	187	—

As will be seen from the above table, Buckler's larva took considerably longer shedding its skin than either of the others, and from his remarks (1886, p. 68) about *the more usual time of between* 10 *and* 15 *minutes* for earlier instars one must infer that his larva was abnormal in that it may have been weakly, particularly as it fell from its twig during the moult (1886, p. 71), a most unusual occurrence, which might have accounted for the abnormally long time, some eighteen minutes in fact, as against 1½ minutes that the larva took to rid itself of the exuviae after it had freed the fourth pair of abdominal prolegs.

It seems strange that in spite of the great detail which Buckler gives in his excellent description of this very complex process, he makes no mention of the following points:

1. The ventral position of the meso- and metathoracic legs during actual ecdysis.
2. The lining of the prothoracic spiracle.
3. The rubbing, cleaning of the head or the clearing of the last abdominal segment.
4. The eating of the exuviae.

He also gives the impression, which seems to have become generally accepted and has been repeated by other authors, that the larvae always moult at night; but as is evident from the two cases quoted above this is certainly not always the case.

It may be of interest to note that the larva, after it had completed its moult, was extremely sensitive to slight tapping or vibration of the birch twig on which it was resting, and for that matter if blown upon or if the nose was blown violently into a handkerchief within two feet of the larva. It would then assume its extreme defensive attitude with the head thrown far back so that the two white spots at the base of the maxillae showed up conspicuously and with the meso- and metathoracic legs thrown wide apart, fully extended and trembling. At the same time the anal processes or filaments were widely separated and appeared to be very slightly rotated along their axes to expose their shiny steel blue normally adjacent surfaces. When the larva adopted this attitude it looked very like a large spider.

In the detailed descriptions of the fully grown larva by Buckler and other authors no mention is made of the two white spots on either side of the mouth beneath, and Bayne appears to be the only one to mention the unusual coloration of the anal filaments. Even Poulton in his paper on lepidopterous larvae in 1888, where he dealt particularly with the means of defence adopted by this larva, did not mention either of these two points which, in the opinion of the writer, are very noticeable when the larva adopts its threatening attitude and add considerably to the general effect. It seems quite remarkable therefore that Poulton makes no mention of them.

LITERATURE

ALLAN, P. B. M., 1937. *A Moth Hunter's Gossip.* London.
BARRETT, C. G., 1896. *The Lepidoptera of the British Islands.* London. **3**:98.
BAYNE, A. F., 1893. *Tr. City Lond. ent. nat. Hist. Soc.*, 1893:4-13.
1893. *Ent. Rec.*, **4**:29-38.
BUCKLER, W., 1880. *Ent. mon. Mag.*, **17**:18. 1866. *Larvae of the British Butterflies and Moths*, **2**:63-72.
FORD, E. B., 1955. *Moths.* The New Naturalist Series (30). London.
IMMS, A. D., 1957. *A General Textbook of Entomology.* London.
MERA, A. W., 1902. *Tr. City Lond. ent. nat. Hist. Soc.*, 1902:42-48.
POULTON, E. B., 1888. *Tr. ent. Soc. Lond.*, 1888:581-588.
ROBERT, P. A., 1931. *Les Chenilles de Léo-Paul Robert.* Paris.
SOUTH, R., 1907. *Moths of the British Isles*, **1**:64. London.
TILLYARD, R. J., 1926. *The Insects of Australia and New Zealand.* Australia.

THE BRITISH PYRALIDAE AND PTEROPHORIDAE IN THE BOWES COLLECTION INCLUDING A NEW SPECIES OF PLUME MOTH (LEP., PTEROPHORIDAE)

By PAUL E. S. WHALLEY

Dept. of Entomology, British Museum (Natural History)

The collection of the late A. J. L. Bowes was presented to the British Museum (Natural History) after his death in the last war. All the specimens are well set and labelled but have apparently never been sorted or identified. Most of the specimens were collected in Kent, with a few from Surrey, Sussex, Norfolk, Dorset and Hants.

The following list of species in this collection follows the arrangement of Beirne (1952), but the nomenclature has been brought up to date. One species of Plume moth was found to be new and is described below.

The county is mentioned only where the locality is not in Kent.

PYRALIDAE

Melissoblaptes zelleri de Joannis (*bipunctanus* Zell), Sandwich, vii and viii.36. *Aphomia sociella* Linn. (*colonella* Linn.), Herne Bay, vii.36; 1 ex. *Calamotropha paludella* Hübn., Barton Broad (Norfolk), vii.38. *Crambus pascuellus* Linn., Wareham (Dorset), vii.36; Godalming (Surrey), vii.31. *C. perlellus* Scop., Wareham (Dorset), vii.36. *C. pratellus* Linn., Godalming (Surrey), vi.31. *C. hortuellus* Hübn., Herne Bay, vii.36; 1 ex. *Pediasia squalidalis* Hübn., (*salinellus* Tutt), Creeksea (Essex), vii.36. *Agriphila geniculeus* Haw., Sandwich, viii.36. *A. inquinatellus* Schiff., Dungeness, viii.38. *A. tristellus* Schiff., Ham, viii.35. *Platytes alpinellus* Hübn., Sandwich, viii.37. *Chilo phragmitellus* Hübn., Herne Bay, viii.35. *Schoenobius gigantellus* Schiff.,

Barton Broad (Norfolk), vii.38; Dymchurch, viii.35. *S. forficellus* Thunb., Herne Bay, vii.36. *S. mucronellus* Schiff., Barton Turf (Norfolk), viii.35. *Acentropus niveus* Oliv., Barton Broad (Norfolk), viii.35; Ashford, viii.35. *Anerastia lotella* Hübn., Sandwich, vii.36. *Homoeosoma sinuella* Fab., Herne Bay, vii.41; 1 ex.; Sandwich, vii.36; 1 ex. *H. cretacella* Roessler, series bred from a ♀ taken at Herne Bay. *H. binaevella* Hübn., Sandwich, vii.36; 1 ex. *Gymnancyla canella* Hübn., Sandwich, viii.36; 2 ex. *Pempelia dilutella* Hübn., Ashford, vii.41; 2 ex. *Epischnia boisduvaliella* Guen., Sandwich, viii.37. *Salebria betulae* Göze., Ashford, vi.36. *Laodamia fusca* Haw. (*carbonariella* F. v. R.), Brockenhurst (Hampshire), vii.39. *Nephopteryx hostilis* Steph., Ashford, vi.36. *N. semirubella* Scop., Lydden, vii.31; Chilham, vii.36; var. *sanguinella*, Lydden, viii.31; Chilham, vii.41. *N. obductella* F. v. R., Ashford, vii.41; Lydden, viii.36; Chilham Downs, viii.32; long series. *N. palumbella* Fab., Wareham (Dorset), vii.36. *Phycita spissicella* Fab., Ham, viii.35. *Acrobasis tumidella Zinck.*, Herne Bay, vii.36; Havant (Hampshire), vii.36. *Eurhodope marmorea* Haw., Chilham, vii.36; 1 ♂. *E. advenella* Zinck., Chilham, vii. 36; 1 ♂, *E. suavella* Zinck., Chilham, vii.36; series. (The three species of *Eurhodope* were all in one series. They have been checked on ♂ genitalia.) *Euzophera pinguis* Haw., Wye, ix.35. *Ectomyelois cribrumella* Hübn., Dungeness, vii.35; 1 ex. *Nyctegretis achatinella* Hübn., Sandwich, vii.36; 3 ex. *Cynaeda dentalis* Schiff., Dungeness, viii.34 and 35. *Parapoynx stratiotata* Linn., Sandwich, viii.36; Lydd, vii.37; Barton (Norfolk), viii.35. *Nymphula nymphaeata* Linn., Lewes (Sussex), vii.37. *Cataclysta lemnata* Linn., Herne Bay, viii.35. *Nomophila noctuella* Schiff., Herne Bay, viii.35; Folkestone, viii.32. *Sitochroa palealis* Schiff., Herne Bay, vii, various years 30-41. *Opsibotys fuscalis* Schiff., Herne Bay, vii.41. *Perinephela verbascalis* Schiff., Herne Bay, vii.41; 1 ex. *Pyrausta purpuralis* Linn., Chilham, vii.36; Ashford, vii.41. *P. nigrata* Scop., Ashford, vii.41; Chilham, vii.41. *P. cespitalis* Schiff., Herne Bay, vii.41.

PTEROPHORIDAE

Agdistis bennetii Curt., Creeksea (Essex), vii.37; long series bred. One specimen labelled 'Faversham, H.C.H., viii.26'. *Oxyptilus distans* Zell., Sandwich, viii.37 and 38; long series. *Amblyptilia acanthodactyla* Hübn., Chilham, viii.36; 1 ex. *Platyptilia calodactyla* Schiff., Ashford, vi.36. *P. pallidactyla* Haw., Herne Bay, vii.41. *Stenoptilia bipunctidactyla* Scop., Ham St., vii.38; Chilham, vii.36; Ashford, vii.41. *S. lunaedactyla* Haw., Sandwich, vi.36 and vii.36; 2 ex. *Alucita tridactyla* Linn., Chilham, vii.36; Nr. Canterbury, vii.35; Ashford, vii.41. *A. pentadactyla* Linn., Sandwich, viii.36; 2 ex. *Oidaematophorus bowesi* Wh., Ham St., vii.35, viii.37, viii.39; 3 ♂ and 1 ♀. *O. tephradactylus* Hübn., Ashford, viii.35. *O. lithodactylus* Treits., Newhaven (Sussex), vii.37; 1 specimen from Wood Walton Fen (Hunts.) collected by J. O. T. Howard.

Oidaematophorus bowesi sp. nov.

Oidaematophorus (*Leioptilus auctt.*) *osteodactylus* Zell. Beirne *partim nec* Zeller, 1952, *British Pyralid and Plume Moths,* p. 184.

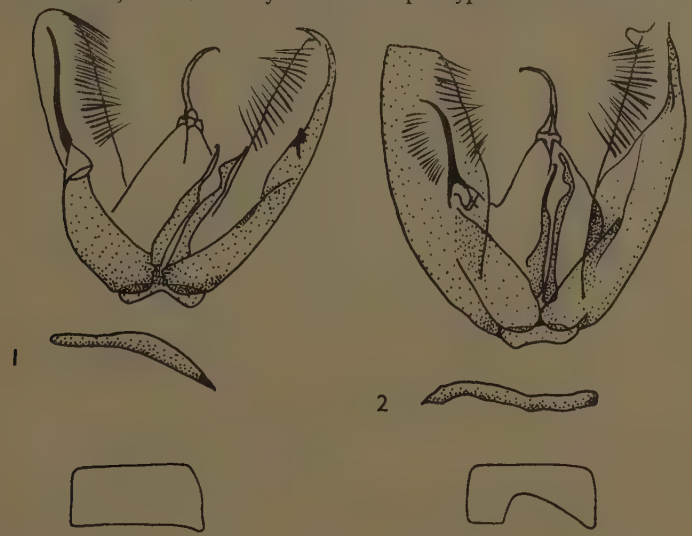
Forewings pale straw coloured with reddish brown longitudinal streak from forewing cleft to base of forewing. Streak varying in size and may extend to apex of forewing, giving whole wing a reddish brown tinge. Black spot at base of cleft in forewing. Hind wings, including fringes, very pale grey sienna. Wing span 25-29 mm.

Male genitalia (Fig. 1).

The female can be separated from the female of *O. osteodactylus* by the shape of VIIIth segment (Figs. 3 and 4).

Holotype: ♂, 'Ashford, Kent, 8.viii.37. Coll. A. J. L. Bowes'. Pyralid Genit. Slide No. 4246. Type in British Museum (Natural History).

Paratypes: 1 ♂, 'Ashford, Kent, 8.viii.37. A. J. L. Bowes Coll'; 1 ♂, 'Kent, 1908, Bainbrigge Fletcher Coll.'; 1 ♂, 'Blean Wood, Kent, 26.6.25. Coll. H. C. Huggins'; 2 ♂, 'Blean Wood, Kent, 22.7.26. Coll. H. C. Huggins'; 7 ♂, 'Folkestone, vii.92. Purdey Coll.'; 1 ♂, 'Faversham, 10.7.1925'; 2 ♂, 'Kent, vii.1925'; 1 ♂, 'Darenth, Kent, 28.ix.94'; 1 ♂, 'Abbot's Wood, Sussex, T. Savage'; 1 ♀, 'Folkestone, vii.92. Purdey Coll'. The paratypes are in the British



Figs. 1-4: (1) Male genitalia and aedeagus of *Oidaematophorus bowesi* sp. n. (2) Ditto, *O. osteodactylus* Zell. (3) Lateral view of tergum of female VIIIth abdominal segment of *O. bowesi* sp. n. (4) Ditto, *O. osteodactylus* Zell.

Museum (Natural History) with the exception of the three from Blean Wood, which are in the private collection of Mr. H. C. Huggins.

Named after the late A. J. L. Bowes in whose collection this species was first recognized.

This species is very close to *O. osteodactylus* Zell., from which it may be distinguished by the darker colouration of the forewing and the absence of a small dark mark near the apex of the forewing. These characters are, however, only reliable in fresh or well preserved specimens. The male genitalia are very distinct from those of *osteodactylus* (*cf.* Figs. 1 and 2). The shape of the apex of the valve can be seen under a microscope without dissection of the genitalia.

I originally believed this species was *O. cinerariae* Millière. Although his description and figure (1869) fit the Kent specimens, examination of one of Millière's original series has proved his species to be *osteodactylus*. With the assistance of Mr. P. Viette (Paris) I have selected a lectotype of *cinerariae* to fix this species. This specimen is labelled 'lectotype', 'Col. Mill.', 'cinerariae Millière'. (Part of this label has been cut away, but Mr. P. Viette has shown me how the remaining ink marks are part of the words, 'Ile St. Marguerite', the type locality.) '694 Wlsm. 894, 1894.' 'Coll. E. Ragonot.' osteodactylus *selons*, Ragonot.' B. M. Pyralid slide No. 4305. The lectotype and slide of *cinerariae* are in the Paris Museum.

Specimens of *bowesi* have been examined from the following localities: Folkestone, 1887 (Austen Coll.); Folkestone, 1892 (Purdey Coll.); Faversham, 1925 (Edelsten Coll.); Brasted, 1925 and 1935, and Folkestone, 1924 (Mackworth-Praed Coll.); Blean, 1947 (Wakely Coll.). All these are from Kent. The only records of this species outside Kent are nine specimens in the Tring Museum labelled 'Abbotswood, Sussex, T. Salvage Coll.' (no date, circa 1900). In the Museum collection there are a few specimens of *bowesi* in a series which may have originated from Draguignan in the south of France. Unfortunately there are no labels on individual specimens and the series is a mixed collection of *osteodactylus* and *bowesi* from the Bainbrigge Fletcher Collection standing above a label 'Eggs laid by May, 1904, Draguignan'.

O. bowesi has evidently been established in Britain for many years (some of the specimens date to 1887), but its actual distribution will have to await further critical collection.

LITERATURE

BEIRNE, B. P., 1952. *British Pyralid and Plume Moths*. London.

BLESZYNSKI, S., 1957. Studies on the Crambidae (Lepid.), Part XIV. Revision of the European species of the Generic Group *Crambus* F. s. 1. *Acta. Zoo. Cracoviensia,* **1**, NR6.

HEINRICH, C., 1956. American Moths of the subfamily Phycitinae. *U.S.N.M. Bull.* 207.

MARION, H., 1957. Classification et nomenclature des *Pyraustidae* d'Europe *L'Entomologiste,* **13**:4-5.

MILLIERE, P., 1869. *Iconographie et Description de Chenilles et Lépidoptères,* **13**.

ADDITIONAL RECORDS OF MICROLEPIDOPTERA COLLECTED IN THE BURREN, CO. CLARE, IRELAND, IN 1951 AND 1952

By J. D. BRADLEY

Dept. of Entomology, British Museum (Natural History)

When the two previous reports (Bradley, 1952 and 1953) on the Microlepidoptera collected in the Burren in 1951 and 1952 were prepared a few specimens remained unidentified and had to be put aside. The Coleophoridae among these have now been worked out as far as possible. They include two species, *Coleophora ramosella* Zeller and *C. derivatella* Zeller, not previously recorded from the British Isles, and two species, *C. versurella* Zeller and *C. therinella* Tengström, not previously recorded from Ireland.

In the course of identifying this residual material some new synonymy and some erroneous identifications in the literature have come to light. These will be mentioned below under the species concerned.

The material now studied is in the British Museum (Natural History).

Coleophora versurella Zeller.

One ♂ and one ♀ taken at m.v. light near Ballyvaughan, 20-31.vii.1952.

This species has not previously been recorded from Ireland. It was only recognised in the British Isles as recently as 1958 following its discovery at Chesil Beach, Dorset (Bradley & Fletcher, 1959) and since has been recorded from the Isle of Wight, Cornwall and the Scilly Isles (Pelham-Clinton, 1959). It is evidently a species long resident in the British Isles but overlooked, as in the British Museum (Natural History) collections are specimens taken in Norfolk in 1890 by Walsingham which had been erroneously determined as *C. troglodytella* Duponchel.

Coleophora tamesis Waters.

One ♀ taken at m.v. light near Ballyvaughan, 20-31.vii.1952.

The following four species belong to the group with white or silvery radiating lines on the forewings. Unless specimens are perfect the species of this group are often difficult or impossible to separate on superficial characters. In contrast the structure of the genitalia of both sexes is very different between species. As the material at my disposal is not sufficient to allow a satisfactory comparison to be made of the species superficially I have relied upon the structure of the genitalia.

Coleophora ramosella Zeller.

Coleophora ramosella Zeller, 1849, *Linnaea ent.*, **4**:322.

Coleophora albicornis Benander, 1936, *Ent. Tidskr.*, **57**:266. Syn. nov.

Eleven ex. taken at m.v. light near Ballyvaughan, 20-31. vii. 1952.

This species has not previously been recognised in the British Isles, and on the Continent has been regarded as a synonym of *troglodytella* Duponchel. It was originally described by Zeller from a specimen taken in Syracuse. This specimen is now in the British Museum (Natural History) and is labelled as type. It is a male, and dissection of the genitalia has proved it to represent a species distinct from *troglodytella.*

The genitalia of the type resemble closely those figured by Benander (*loc. cit.*) for *albicornis,* and superficially the type fits Benander's description except that it does not show the underside markings on the forewing. This difference seems unlikely to be of specific importance and I have therefore regarded the two species as conspecific.

The Burren specimens differ from the type and from Benander's description in that the antenna is not wholly white but is distinctly annulate, and also the general coloration of the forewing tends to be greyish. But the male genitalia, Fig. 1, appear to be identical with those of the type of *ramosella* except that in the specimen figured the aedeagus is not curved like that of the type, Fig. 2. This difference in the shape of the aedeagus is probably due to different mounting positions in the slide preparations. The female genitalia, Fig. 3, are figured from a Burren specimen.

Benander (*loc. cit.*) and Toll (1953) state that the food-plant is *Solidago virgaurea.*

Coleophora derivatella Zeller.

Coleophora derivatella Zeller, 1849, *Linnaea ent.* **4**:326.

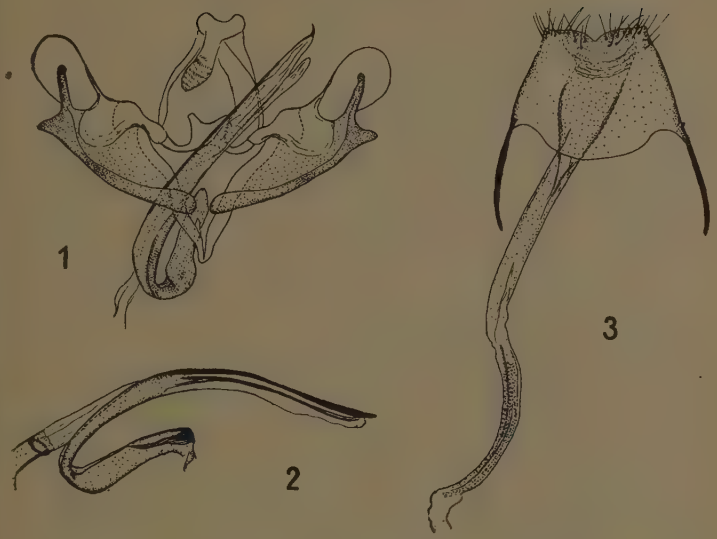
Coleophora inulaefoliae Benander, 1936, *Ent. Tidskr.*, **57**:268. Syn. nov.

Coleophora inulifolia Benander, 1939, *Opusc. ent.*, **4**:77.

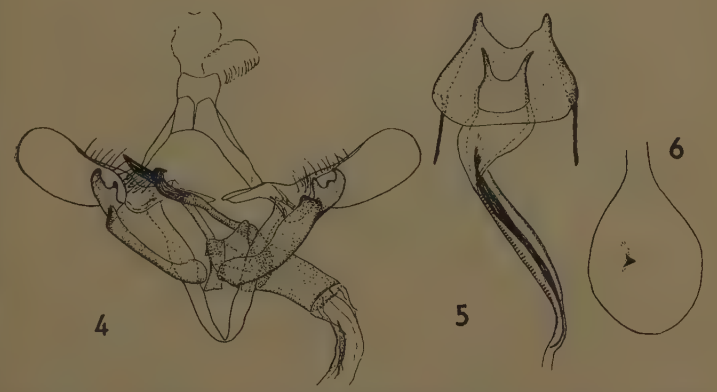
Eupista troglodytella Duponchel Pierce *nec* Duponchel, 1935. *The Genitalia of the Tineid Families of the Lepidoptera of the British Isles,* p. 67, pl. 40.

One ♂ bred from larval cases on *Eupatorium* collected 3-7.vi.1951; moth emerged 23.vii.1951.

This species has been known in the British Isles for many years but appears to have escaped recognition due to confusion with *troglodytella* Duponchel, and may stand in collections under this name. In the British Museum (Natural History) are specimens bred from larvae on *Eupatorium* collected at Merton, Norfolk, by Durrant in 1898. The genitalia figures of *troglodytella* in Pierce (*loc. cit.*) are erroneous and belong to *derivatella.*



Figs. 1-3: Genitalia of *Coleophora ramosella* Zeller. (1) Male, ventral aspect. (2) Aedeagus of type, lateral aspect. (3) Female, ventral view of ostium and spiculate portion of ductus bursae.



Figs. 4-6: Genitalia of *Coleophora derivatella* Zeller. (4) Male, ventral aspect. (5 and 6) Female, ventral view of ostium and spiculate portion of ductus bursae (5), and bursa copulatrix and signum (6).

C. derivatella Zeller was originally described from two male specimens collected in Syracuse on 23rd May and 7th June, 1844. These two syntypes are now in the British Museum (Natural History), and as a type was not indicated by Zeller I have selected the June specimen as lectotype (genitalia slide 4282). The genitalia of the lectotype appear to be identical with those figured by Benander (*loc. cit.*) for *inulaefoliae,* and the latter has therefore been placed in synonymy.

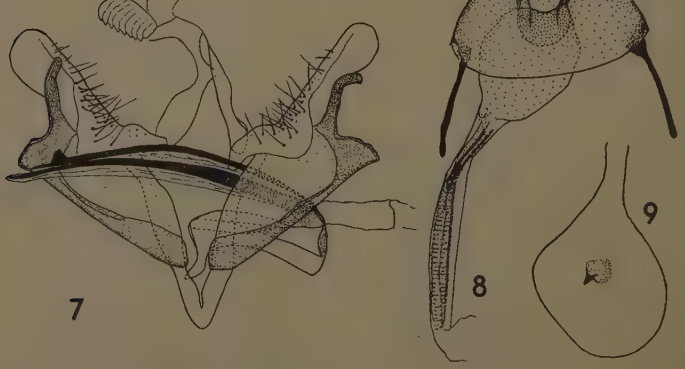
The male genitalia are shown in Fig. 4 and the female in Figs. 5 and 6.

Benander (1936 and 1938-39) states that the food-plant in Sweden is *Eupatorium* and *Inula salicifolia,* and Hackman (1945) gives *Eupatorium* and *Inula salicina* as the food-plants in Finland.

Coleophora troglodytella Duponchel.

This species was reared from cases on *Eupatorium* collected at various localities on the Burren in June, 1951, and has already been recorded (Bradley, 1952). The record is now verified following re-examination of the material.

By courtesy of Monsieur P. Viette of the Muséum National d'Histoire Naturelle, Paris, the type specimen of *troglodytella* Duponchel was compared with examples of this species collected in the British Isles. A superficial comparison only was possible since the abdomen of the type is missing. The genitalia of a male, Fig. 7, and a female, Figs. 8 and 9, believed to be conspecific with the type are figured.



Figs. 7-9: Genitalia of *Coleophora troglodytella* Duponchel. (7) Male, ventral aspect. (8 and 9) Female, ventral view of ostium and spiculate portion of ductus bursae (8), and bursa copulatrix and signum (9).

The larva of this species is fairly polyphagous and has been recorded on *Eupatorium, Inula, Carduus, Achillea, Tanacetum, Artemisia* and *Hieriacium.*

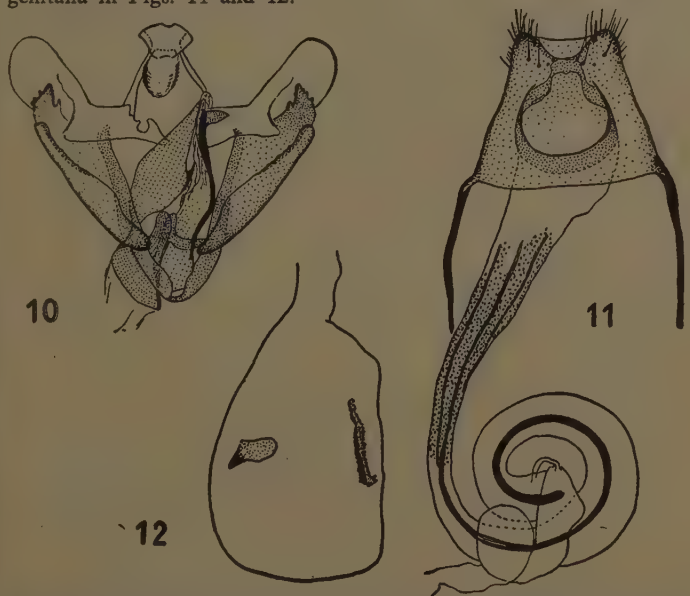
Coleophora therinella Tengström.

Seven ex. taken at m.v. light near Ballyvaughan, 20-31.vii.1952.

Records of *therinella* in the British Isles need to be investigated as the species appears to have been misidentified in our literature and in collections. The genitalia figured as this species in Pierce (1935, pl. 50) are incorrect and belong to the species *peribenanderi* Toll. Specimens taken at Lee, Kent, in 1898, by B. Bower and now in the Eustace Bankes collection in the British Museum (Natural History) under the name *therinella* have on dissection proved to be *peribenanderi.* But specimens from Lewisham, Kent, taken in 1851, in the Stephens-Stainton collection are the true *therinella.*

The type of *therinella* Tengström has not been seen by me, and I have followed Benander (1938-39), Hackman (1945) and Toll (1953) in identifying this species.

The genitalia of the male are shown in Fig. 10, and the female genitalia in Figs. 11 and 12.



Figs. 10-12: Genitalia of *Coleophora therinella* Tengström. (10) Male, ventral aspect. (11 and 12) Female, ventral view of ostium and spiculate portion of ductus bursae (11), and bursa copulatrix and signa (12).

On the Continent the food-plants are stated to be *Carduus, Carlina* and *Cirsium.*

The correct name and synonymy of the species misidentified in this country as *therinella* Tengström should be as follows:

Coleophora peribenanderi Toll.

Coleophora benanderi Toll *nec* Kanerva.

Eupista therinella Tengström Pierce *et auct. nec* Tengström.

On the Continent the larval food-plant of *peribenanderi* is stated to be *Carduus arvensis.*

REFERENCES

BENANDER, P., 1936. Fjarilar fraon Kivik och Kennekulle. *Ent. Tidskr.,* **57**:261-269.

1938-39. Die Coleophoriden Schwedens. *Opusc. ent.,* **3**:107-124; **4**:30-110.

BRADLEY, J. D., 1952. Microlepidoptera collected in the Burren, Co. Clare, Ireland, in 1951 . . . ..*Ent. Gaz.,* **3**:185-192.

1953. Microlepidoptera collected in the Burren, Co. Clare, Ireland, in 1952. . . . *Ent. Gaz.,* **4**:135-140.

BRADLEY, J. D. & **FLETCHER, D. S.,** 1959. Lepidoptera records from the Isle of Portland and Chesil Beach, including a description of *Coleophora versurella* Zeller, a species new to the British list. *Entomologist,* **92**:27-33.

PELHAM-CLINTON, E. C., 1959. *Coleophora sternipennella* (Zetterstedt) (Lep., Coleophoridae), a new British species: with a key to the British *Coleophora* on *Chenopodium* and *Atriplex. Entomologist,* **92**:120-124.

HACKMAN, W., 1945. Die Coleophoriden Finnlands. *Notul. ent.,* **25**:1-63.

PIERCE, F. N. & **METCALFE, J. W.,** 1935. *The Genitalia of the British Tineina,* xii; pp. 116, pls. 60. Oundle.

TOLL, S., 1953. Eupistidae of Poland. *Docum. physiogr. Polon.,* **32**:1-292.

AMARA NITIDA STURM (COLEOPTERA) IN CUMBERLAND

During the summer of 1959 I took an *Amara* sp. under a stone on Cumrew Fell, Cumberland. This has been critically examined by Mr. F. H. Day, F.R.E.S., who has verified it as *Amara nitida* Sturm, a species new to the county. In Dr. B. P. Moore's list of the British Carabidae (1957, *Ent. Gaz.,* **8**:178) *A. nitida* is shown to occur in five British counties.

W. F. DAVIDSON.

9 Castlegate,
Penrith, Cumberland.

BEMBIDION FLUVIATILE DEJ. (COLEOPTERA) IN CUMBERLAND

During the summer and autumn of 1959 I collected a number of beetles of the genus *Bembidion* on the banks of the River Eden at Langwathby. These were of the '*ustulatum* type', but on being critically examined by Mr. F. H. Day, F.R.E.S., a few of them turned out to be *B. fluviatile* Dej., a species new to Cumberland.

W. F. DAVIDSON.

9 Castlegate,
Penrith, Cumberland.

SIPHONAPTERA FROM NORTHUMBERLAND

By M. J. COTTON, B.Sc.
(*Hope Dept. of Entomology, Oxford*)

The main purpose of this paper is to bring forward five new records and to revise the work of R. S. Bagnall (1919) and others on the flea fauna of this county. Thirty-two of the 56 British species and sub-species are now on record and available for the recorded distribution of British fleas being compiled by F. G. A. M. Smit and R. S. George. I wish to thank especially Mr. R. S. George, who has given me guidance in this field, and who has identified many of the specimens that I have taken. Also to Dr. E. T. Burtt for advice in various aspects of my work, and finally to my colleague, D. A. Humphries, with whose aid the report on mammals and fleas at Jesmond Dene, Newcastle-upon-Tyne was compiled.

A survey was carried out from December, 1957, to March, 1958, on a small mammal population and its fleas, along a wild grassy bank above some allotments on the west side of Jesmond Dene. Originally break-back traps were used, but in March, 1958, eleven Longworth traps were available and set in an area previously untrapped. The five sites selected were found to differ in both mammals occurring, their abundance and the fleas carried. Traps were examined twice a day, all mice trapped being placed in a polythene bag and investigated in the laboratory. Live mammals were taken from the site in the trap and examined for fleas by blowing on the fur. The mammal was measured, replaced in the trap and released at the same site that it had been trapped.

Results indicate a far greater success with live trapping than with break-backs, though I have found that mammals caught alive lose some fleas. These may be found adhering to the wet trap or mixed up with the oats used as bait.

Three species of small mammals have been trapped: *Microtus agrestis hirtus* (Bellamy), *Apodemus sylvaticus sylvaticus* (L.), and *Sorex araneus castaneus* Jenyns; from these hosts the following fleas were taken:

Hystrichopsylla talpae talpae (Curtis)—*Microtus, Sorex.*
Rhadinopsylla pentacantha (Rothschild)—*Microtus.*
Palaeopsylla soricis soricis (Dale)—*Sorex.*
Palaeopsylla minor minor (Dale)—*Sorex.*
Ctenophthalmus nobilis vulgaris Smit—*Microtus, Sorex, Apodemus.*
Leptopsylla segnis (Schönherr)—*Microtus.*
Peromyscopsylla silvatica spectabilis (Rothschild)—*Microtus.*
Megabothris walkeri (Rothschild)—*Microtus.*

Only the results obtained with *Microtus* are significant owing to the small numbers of individuals of *Sorex* and *Apodemus* trapped.

Using Longworths, 40 specimens of *Ctenophthalmus nobilis* were taken from five *Microtus*—an average of eight fleas per host. The average with break-backs was one flea per host, eleven voles being examined. On 7.3.58 a vole was examined and fifteen fleas removed, all of which were *Ctenophthalmus nobilis vulgaris*. The mammal was retrapped three times, but on each occasion no repopulation had occurred, and it was not until 17.3.58 that 1 ♀ *C. nobilis* was recorded. This flea was removed, and on 20.3.58 when trapping stopped there was still no repopulation. This appears to indicate that no immediate repopulation occurs from fleas in the nest or those parasitic on other individuals.

Hystrichopsylla talpae was found to leave the host soon after death, for in two shrews examined dead in the Longworth traps this flea had left the host and was found in the trap. No other fleas were to be seen in the trap and *Ctenophthalmus nobilis* remained on the body of the dead shrews. This may account for the fact that no *H. talpae* were found on the ten shrews caught in break-backs, although from these shrews fourteen *C. nobilis,* five *Palaeopsylla soricis* and one *Palaeopsylla minor* were taken. The latter specimen was of special interest as it is primarily a flea of moles, and in the vicinity there appear to be no such mammals. It is likely that moles were present at one time and that on extermination a population of *Palaeopsylla minor* survived on the closely related shrews.

TABLE I

Fleas taken from the bodies of small mammals at Jesmond Dene 1957-8:

(a) Break-back traps			(b) Longworth traps			
	Microtus		*Sorex*		*Apodemus*	
	(a)	(b)	(a)	(b)	(a)	(b)
No. of hosts examined ...	11	5	10	3	5	0
No. of hosts without fleas	4	1	2	0	2	0
P. silvatica spectabilis ...	4♀ 2♂	–	–	–	–	–
L. segnis	1♀ 0♂	–	–	–	–	–
R. pentacantha	1♀ 0♂	0♀ 1♂	–	–	–	–
C. nobilis vulgaris	6♀ 5♂	25♀ 19♂	8♀ 6♂	0♀ 3♂	2♀ 3♂	–
M. walkeri	0♀ 1♂	–	–	–	–	–
P. minor minor	–	–	1♀ 0♂	–	–	–
P. soricis soricis	–	–	3♀ 2♂	–	–	–
H. talpae talpae	–	1♀ 0♂	–	0♀ 2♂	–	–

The following list of fleas form a complete survey of the available literature and of unpublished records made by Dr. E. T. Burtt (E.T.B.) and myself (M.J.C.).

New county records are marked with an asterisk.

Superfamily—Pulicoidea

Family—Pulicidae

Subfamily—Pulicinae

Pulex irritans L., 1758.

'Common on man and often found on the badger; also on the fox'

(Bagnall). 'Abundant on the sands at Tyneside pleasure resorts in summer' (Walsh, 1924). 1 ♀, ex human, Newcastle, 3.5.55, E.T.B.; 1 ♀, ex human, Newcastle, 5.12.55, E.T.B.; 1 ♂, ex human, Newcastle, 8.3.56, E.T.B.; 1 ♂, ex human, Newcastle, 20.10.58, M.J.C.

Subfamily—Archaeopsyllinae

Archaeopsylla erinacei erinacei (Bouché), 1835.

'Extremely common on the hedgehog', Wylam-on-Tyne (Bagnall). 1 ♀, ex hedgehog, Lesbury, near Alnwick, 20.7.57, E.T.B.

Ctenocephalides canis (Curtis), 1826.

'Common on dogs and cats' (Bagnall).

Ctenocephalides felis felis (Bouché), 1835.

'Common on dogs and cats' (Bagnall). The following specimens have been taken in houses at Newcastle-on-Tyne and the surrounding district by Dr. Burtt and Dr. Bolam, during their investigations concerning the cause of papular urticaria in children (Bolam and Burtt, 1958). 1 ♂, 29.10.54; 1 ♂, 14.12.54; 3 ♂ 3 ♀, North Shields, 15.12.54; 1 ♂, 17.1.55; 1 ♀, 3.10.55; 2 ♂ 1 ♀, 6.10.55; 22 ♀ 10 ♂, 7.3.56; 2 ♂, Cullercoats, 10.4.56; 1 ♂, 17.8.56; 1 ♂ 2 ♀, 19.12.56; 3 ♂ 6 ♀, 10.4.57; 1 ♀, ex human, 10.10.58, M.J.C.

All records, unless otherwise stated, are from Newcastle-on-Tyne.

Subfamily—Spilopsyllinae

Spilopsyllus cuniculi (Dale), 1878.

'Very common on the ears of rabbits', and taken from warrens at Corbridge and Seahouses (Bagnall).

Superfamily—Ceratophylloidea

Family—Hystrichopsyllidae

Subfamily—Hystrichopsyllinae

Hystrichopsylla talpae talpae (Curtis), 1826.

The largest British flea (5-6 mm. long), of which 1 ♂ 3 ♀ were taken from a short-tailed field mouse in the Cheviot by Mr. J. Hardy (Bold, 1870); common in nests of moles on the Irthing (Bagnall); 1 ♂, ex mole, Blagdon, 11.12.56, E.T.B.; 1 ♀, ex *Microtus,* Jesmond Dene, 9.3.58, M.J.C.; 1 ♂, ex *Sorex,* Jesmond Dene, 10.3.58, M.J.C.; 1 ♂, ex *Sorex,* Jesmond Dene, 13.3.58, M.J.C.; 5 ♂ 22 ♀, nest of *Microtus,* Jesmond Dene, 19.10.58, M.J.C.

Subfamily—*Rhadinopsyllinae*

Rhadinopsylla pentacantha (Rothschild), 1897.

'On moles and in their nests on the Irthing, but apparently rare' (Bagnall); 1 ♂, ex mole, Blagdon, 11.12.56, E.T.B.; 1 ♀, ex *Microtus,* Jesmond Dene, 7.12.57, M.J.C.; 1 ♂, ex *Microtus,* Jesmond Dene, 13.3.58, M.J.C.

Subfamily—Ctenophthalminae

Doratopsylla dasycnema dasycnema (Rothschild), 1897.

'Not uncommon in mole nests on the Irthing' (Bagnall); the true hosts are, however, the common shrew, pygmy shrew and water shrew.

* *Palaeopsylla soricis soricis* (Dale), 1878.

1 ♀, ex *Sorex araneus*, Jesmond Dene, 18.1.58, M.J.C.; 1 ♀ 2♂, ex *Sorex araneus*, Jesmond Dene, 20.1.58, M.J.C.; 1 ♀, ex *Sorex araneus*, Jesmond Dene, 27.1.58, M.J.C.

Palaeopsylla minor minor (Dale), 1878.

'In mole nests on the Irthing' (Bagnall); 1 ♂ 4 ♀, ex mole, Alnwick Park, 20.2.54, E.T.B.; 155 specimens, ex mole, Blagdon, 11.12.56, E.T.B.; 1 ♀, ex *Sorex araneus*, Jesmond Dene, 13.1.58, M.J.C.

* *Ctenophthalmus bisoctodentatus occidentalis* Smit, 1956.

Eight specimens, including both sexes, ex mole, Blagdon, 11.12.56, E.T.B.

* *Ctenophthalmus nobilis vulgaris* Smit, 1955.

This species was formerly known as *Ctenophthalmus agyrtes* (Heller), and as such was recorded from the western borders of Northumberland (Bagnall). The following specimens have shown the subspecies to be *C. nobilis vulgaris*: 2 ♀ 1 ♂, ex mole, Blagdon, 11.12.56, E.T.B.; specimens taken at Jesmond Dene:

(a) host—*Microtus agrestis*.

2 ♂, 7.12.57; 2 ♀ 1 ♂, 7.12.57; 2 ♀, 8.12.57; 1 ♀, 9.12.57; 7 ♀ 5 ♂, 7.3.58; 9 ♀ 8 ♂, 9.3.58; 7 ♀ 6 ♂, 9.3.58; 1 ♂, 19.3.58; 2 ♂ 1 ♀, 4.2.58; 1 ♂, 18.11.58; 2 ♂ 1 ♀, 19.11.58.

(b) host—*Apodemus sylvaticus*.

1 ♂ 1 ♀, 6.12.57; 1 ♀, 8.12.57; 2 ♂, 30.1.58.

(c) host—*Sorex araneus*.

1 ♀, 13.1.58; 2 ♀ 1 ♂, 15.1.58; 1 ♂, 9.1.58; 1 ♀ 1 ♂, 20.1.58; 1 ♀ 1 ♂, 27.1.58; 3 ♀ 1 ♂, 27. 1. 58; 1 ♂, 28.1.58; 1 ♂, 10.3.58; 2 ♂, 15.3.58.

(d) nest of *Microtus agrestis*.

25 ♂ 35 ♀, 19.10.58.

All specimens recorded by M. J. Cotton.

Family—Ischnopsyllidae

Subfamily—Ischnopsyllinae

* *Ischnopsyllus hexactenus* (Kolenati), 1856.

1 ♀, ex long-eared bat (*Plecotus auritus*), Brisley, Alnwick Park, 23.4.56, E.T.B.

Ischnopsyllus octactenus (Kolenati), 1856.

'On a pipistrelle bat taken by Mr. Walton Lee at Corbridge' (Bagnall).

Ischnopsyllus simplex simplex (Rothschild), 1906.

'On a whiskered bat taken by Mr. G. Bolam in Hexham, 1916' (Bagnall). 1 ♂ 3 ♀ were taken and were the first host record for this species of flea, all specimens having previously been recorded from Natterer's bat. The four fleas are now in the Rothschild Collection.

Family—Leptopsyllidae

Subfamily—Leptopsyllinae

Leptopsylla segnis (Schönherr), 1811.

Very common on the house-mouse and taken by E. L. Gill in Newcastle (Bagnall). 6 ♂ 2 ♀, ex *Mus musculus,* Newcastle, 22.11.55, E.T.B.; 1 ♀, ex *Microtus agrestis,* Jesmond Dene, 5.12.57, M.J.C.

* *Peromyscopsylla silvatica spectabilis* (Rothschild), 1898.

Less abundant than the other small mammal fleas, and found principally on voles. 1 ♂ 3 ♀, ex *Microtus agrestis,* Jesmond Dene, 3.12.57, M.J.C.; 1 ♂ 1 ♀, ex *Microtus,* Jesmond Dene, 3.12.57, M.J.C.; 1 ♀, ex *Microtus,* Jesmond Dene, 18.11.58, M.J.C.

Family—Ceratophyllidae

Subfamily—Ceratophyllinae

Paraceras melis melis (Walker), 1856.

Several specimens taken by S. E. Cook from a badger at Ponteland, 1929 (Bagnall, 1930).

Dasypsyllus gallinulae gallinulae (Dale), 1878.

'In nest of wren (*Troglodytes troglodytes*) at Holystone' (Bagnall). 1 ♀, ex *Certhia familiaris,* Howick, 1.11.34, W. H. Pollen, and now in the Rothschild Collection.

Nosopsyllus fasciatus (Bosc), 1800.

'Specimens in the British Museum Collection at Tring.' 1 ♀, ex sleeping-box of cat, Newcastle, 8.10.56, E.T.B.

Mafaraeus penicilliger mustelae (Dale), 1878.

'In mole nests on the Irthing' (Bagnall).

Megabothris walkeri (Rothschild), 1902.

'From nests of small mammals at Stocksfield' (Bagnall). 1 ♀, ex mole, Blagdon, 11.12.56, E.T.B.; 1 ♂, ex *Microtus,* Jesmond Dene, 9.12.56, M.J.C.; 9 ♂ 6 ♀, nest of *Microtus,* Jesmond Dene, 19.10.58, M.J.C.

Monopsyllus sciurorum sciurorum (Schrank), 1803).

'One specimen from a stoat at Wylam-on-Tyne, D. Clague (Bagnall). 2 ♀ 2 ♂, nest of squirrel, Stocksfield, 16.3.58, M.J.C.

Ceratophyllus rusticus Wagner, 1903.

'Twenty-nine specimens of both sexes from a nest of *Delichon urbica,* Dilston Farm, Corbridge, August, 1911' (Bagnall).

Ceratophyllus hirundinis hirundinis (Curtis), 1826.

'Well over one hundred specimens from a nest of *Delichon urbica,* Stocksfield, 11.8.11; 200 from a nest of *Delichon urbica,* Dilston Farm, Corbridge, August, 1911, and from which a further 2-300 were reared in the following September and October' (Bagnall).

Ceratophyllus styx jordani Smit, 1955.

'Swarming in the nests of *Riparia riparia* at Wylam-on-Tyne and Hexham' (Bagnall). 2 ♀ 2 ♂, nests *Riparia,* Wylam-on-Tyne, 1958, E.T.B.

Ceratophyllus farreni farreni Rothschild, 1905.

'From nests of *Delichon urbica*; 37 in a nest at Stocksfield, and four in a nest at Dilston Farm, where this species seems to be replaced by the rarer *Ceratophyllus rusticus*' (Bagnall). 1 ♂, nest of *Delichon urbica,* Scot's Gap, 10.6.55, E.T.B.

Ceratophyllus vagabundus insularis Rothschild, 1906.

'Four specimens from a nest and one on the body of *Phalacrocorax carbo,* Farne Islands, July, 1911' (Bagnall).

Ceratophyllus gallinae gallinae (Schrank), 1803.

'In nests of *Delichon urbica,* Stocksfield; nest of *Emberiza melanocephala,* Hexham; nest of *Apus apus,* Newcastle; ex *Cinclus cinclus,* Rothbury, July, 1906' (Bagnall). 1 ♂, bedding of cat, Newcastle, 27.5.54, E.T.B.; 1 ♀, nest of *Turdus merula,* Newcastle, 22.5.58, M.J.C.

Ceratophyllus fringillae (Walker), 1856.

'Two specimens in nest of *Apus apus,* Newcastle, A. Richardson' (Bagnall).

Ceratophyllus columbae (Gervais), 1844.

'1 ♀, ex domestic pigeon, Newcastle, L. Gill' (Bagnall); 3 ♂ 2 ♀, nest of domestic pigeon, Newcastle, 18.10.55, E.T.B.; 2 ♀, and several larvae, nest of domestic pigeon, Newcastle, 14.10.55, M.J.C.

Ceratophyllus garei Rothschild, 1902.

'Three in the burrow of *Fratercula arctica* and one in the nest of *Somateria mollissima,* from which numerous fleas were bred later, Farne Islands' (Bagnall); 2 ♂ 5 ♀, nest of *Alauda arvensis,* Beadnell, and 247 ♂ 258 ♀, from nest of *Anthus pratensis,* Beadnell (Ash, J., 1952).

REFERENCES

ASH, J., 1952. Siphonaptera, bred from birds' nests. *Ent. mon. Mag.,* **88**:217-222.

BAGNALL, R. S., 1919. The Siphonaptera (Fleas) of Northumberland and Durham. *Trans. nat. Hist. Soc. Northumberland, Durham & Newcastle.* **5**:181-198.

BAGNALL, R. S., 1930. Records of some ectoparasites of the otter and badger. Vasculum, **16**:6-9.

BOLAM, R. M. & **BURTT, E. T.,** 1956. Flea infestation as a cause of papular urticaria. *Brit. Med. Journ.* **1**:1130.

BOLD, T. J.,1870. Entomological notes for the year 1869. *Nat. Hist. Trans. Northumberland, Durham & Newcastle.* **3**:376-380.

GEORGE, R. S., 1958. More information concerning the distribution and hosts of Siphonaptera in Britain. *Ent. Gaz.* **9**:29-31.

HOPKINS, G. H. E. & **ROTHSCHILD, M.** An illustrated catalogue of the Rothschild collection of fleas (Siphonaptera) in the British Museum (Nat. Hist.). London. 1953. (Vol. **1**) and 1956 (Vol. **2**).

ROTHSCHILD, M., 1952. A collection of fleas from the bodies of British birds, with notes on their distribution and host preferences. *Bull. Brit. Mus. (nat. Hist.), Ent.* **2**:187-232.

SMIT, F. G. A. M., 1955. Two new subspecies of fleas (Siphonaptera) from the British Isles. *Trans. R. ent. Soc. Lond.* **107**:341-356.

SMIT, F. G. A. M., 1957. The recorded distribution and hosts of Siphonaptera in Britain. *Ent. Gaz.* **8**:45-75.

SMIT, F. G. A. M., 1957. Handbooks for the identification of British insects. **1** (16). Siphonaptera. *R. ent. Soc. Lond.*

WALSH, G. B., 1924. The passage of apterous insect parasites, etc., from host to host. *Ent. mon. Mag.* **60**:143-148.

WILLIAMSON, K., 1954. The Fair Isle apparatus for collecting bird ectoparasites. *Brit. Birds.* **47**:234-235.

NOTES ON THE LARCH SAWFLY, *PRISTIPHORA ERICHSONII* (HTG.) (HYMENOPTERA: TENTHREDINIDAE), IN GREAT BRITAIN

By M. G. MAW, *Assistant Entomologist*
Entomology Research Institute for Biological Control, Research Branch, Canada Department of Agriculture, Belleville, Ontario.

The larch sawfly, *Pristiphora erichsonii* (Htg.), is an important forest pest in Canada, where attempts to control it by biotic agents have been in progress since 1910. As part of this programme, studies of the sawfly and its control agents were made in Britain in 1954-56. Much of this paper is a review of the history of the sawfly in England and Scotland, with additional notes concerning encapsulation of eggs of *Mesoleius tenthredinis* Morley by *P. erichsonii* and of *Vespula vulgaris* (L.) as a predator of the sawfly.

HISTORY OF THE SAWFLY IN BRITAIN

P. erichsonii is Holarctic in distribution, though its origin is obscure. Great Britain is the one area to which the insect must have been introduced, as there are in Britain no indigenous species of *Larix*, the sawfly's exclusive host. The date of introduction of *P. erichsonii* is unknown, but various species of larch were introduced into Britain from time to time during the past 300 years. Nuttall (1913) quoted from *Earthly paradise* written by Parkinson in 1629 as follows: [larch] *in our land being rare and nourished up with a few and those merely lovers of rarities.* Gardener (1952) referred to larch planted at Wimbledon in 1712 or 1713, and Mitchell (1954) reported that two trees felled near Epsom were among the earliest-planted larch known at that time in Britain and were contemporary with those at Wimbledon.

The planting of larch as a forestry programme did not commence until about 1738, when the Duke of Atholl imported European larch, *Larix decidua* Miller, from the Tirol, Austria. Between 1738 and 1830 the Atholls planted at least 1,400,000 larch trees on 10,000 acres (Nuttall, 1913).

American larch, *Larix laricina* (Du Roi) K. Koch, was introduced into Europe before 1737 (Bailey, 1923) and into Britain about 1760 (Dallimore and Jackson, 1931). Siberian larch, *Larix sibirica* Ledebour, was brought to England in 1806; Manchurian larch, *Larix dahurica* Turczaninow, in 1827; and Japanese larch, *Larix leptolepis* (Sieb. and Zucc.) Gordon, in 1861 (Dallimore and Jackson, 1931).

The foregoing indicates only that the larch sawfly may have been in Britain for many years before it was found there. Its origin cannot be determined, though it probably entered Britain from Europe.

The first reference to *P. erichsonii* in Britain was made by Cameron (1885, pp. 50-51), who stated that the sawfly was not common. He had seen only one specimen and did not know where it had been captured. He noted, however, that Mr. Dale had captured specimens at Glanville's Wootton in Dorset.

The larch plantations in the Lake District of England (i.e. parts of the counties of Cumberland, Westmorland and Lancashire) were reported to have been defoliated about 1868 by a larva thought to be that of the sawfly (anon., 1910). Hewitt (1912) mentioned 'a doubtful record of the occurrence of the sawfly about fifty years ago'. Mr. J. Hodgson, of Thirlmere (personal communication), remembers his father relating that the Thirlmere larches were defoliated 'about 1870', and, from what he can recall, by the same pest that attacked the larches at Thirlmere in 1906. It is impossible to date accurately this early attack on the larch, or indeed to identify the defoliating agent. It is probable, however, that *P. erichsonii* was responsible for the defoliation of larch in the Lake District between 1860 and 1870.

MacDougall (1906) reported that there were only three specimens of *P. erichsonii* in the collection of the British Museum (two from Cameron's collection and one from Stephen's collection), all without locality labels. However, Theobald (1906) listed the following as localities of capture: Esher, Surrey; Wye, Kent; Great Staughton, Huntingdonshire; and Budleigh Salterton, Devonshire.

Because these records created no concern it may be assumed that the population of the pest was small and that any outbreaks, if they occurred, were very localized and of short duration.

The Ministry of Agriculture and Fisheries was not notified of a serious outbreak of the pest until 1906, when a 'strong infestation' was reported to be centred in the Lake District (Hanson, 1951). The attack had, however, aroused the anxiety of the local foresters in 1904, and in 1905 the sawfly population was increasing. In 1906 a great deal of damage had been done to the larch near Keswick, Cumberland, and localized infestations were noted at Cockermouth, Cumberland, and at Chopwell, Northumberland (Smith-Hill, 1907).

Though the outbreak was first reported officially from the Lake District in 1906, subsequent reports showed that at about the same time an infestation of similar intensity developed in Wales. The centre of the Welsh infestation appears to have been near Cemmaes and Dinas Mawddwy in Merionethshire. In Scotland, one tree at Sundrum, Ayrshire, was found to be infested in 1907 (anon., 1910).

In 1909 the Ministry of Agriculture and Fisheries surveyed for sawfly infestations throughout Great Britain and the sawfly was found wherever larch was grown (Hanson, 1951, p. 86). Use of a scale of degree of infestation that ranged from I (very severe) to IV (very slight) was an outcome of the survey.

Within six years larch forests in some 18,000 square miles of Wales were attacked. The number of square miles for each degree of infestation was: I, 1-2; II, 6-8; III, 400; IV, 1,400 (anon., 1910). Despite the area over which the sawfly had spread comparatively little damage was done. Serious damage to the tree occurs when the degree of infestation is I or II, which occurred only in one to two per cent. of the whole area. Moreover, the figures refer to total land area and not to actual forested area.

In the Lake District, the Dodd Wood, near Keswick, Cumberland, suffered most, and by 1909 some 16,000 larch trees had died as a result of repeated defoliations. From this centre of infestation the sawfly spread throughout the Lake District. The larches in the vicinity of Keswick and Thirlmere Lake were almost completely defoliated, but the attack was less severe south of Thirlmere.

In Scotland the sawfly was widely distributed in 1909 but did not constitute a menace. No centres of infestation were located.

There was considerable fluctuation in the sawfly populations in the more heavily infested districts during 1911-1913, and Middleton (1914, pp. 58-77) concluded from the results of the surveys that a recrudescence of the infestation had taken place in parts of the Lake District. The severest attacks were almost over in most areas by this time and the trees at Thirlmere were from 1911 beginning to recover rapidly (Hewitt, 1912; Wardle, 1914).

The dead and dying trees were felled, and during World War I most of the older stands of larch were harvested. By 1920 no trace of the sawfly was found in Britain (Hanson, 1951, p. 87).

Hanson (1951, p. 87) found about a dozen larch sawfly cocoons after several days' search at Thirlmere during the winter of 1933. In the following year he found a few more. Fourteen years later, in the summer of 1948, a few larvae were found feeding on European larch in Radnor Forest, Radnorshire, Wales. As a result the Entomology Section of the Forestry Commission conducted a survey of the current distribution of *P. erichsonii* and other sawflies on larch in Britain. The population of *P. erichsonii* was estimated on the basis of the number of clutches of larvae and oviposition sites found in selected forest areas.

The survey of 1948 showed *P. erichsonii* present and not too difficult to find in Radnor Forest, Radnorshire; Mortimer, Shropshire; and the Manchester Corporation Waterworks estate at Thirlmere, Cumberland. The infestations at Radnor and Mortimer were light, and at Thirlmere 48 Japanese larch and 67 European larch trees had been attacked (Hanson, 1951, p. 87). In the same year two clutches of larvae were found in the Alice Holt Wood, near Farnham, Surrey (Hanson, 1952, p. 105).

In 1950 the survey was extended to include the forests at Brecon and Crychan, Brecknockshire; Kershope, Cumberland; Chopwell, Durham; Harwood, Slayley and Wark, Northumberland; and New-

castleton and Wauchope, Roxburghshire. Very light infestations (not more than eight clutches per forest) were found in these areas. Heavier infestations of 20, 21 and 34 clutches were found in Northumberland at Redesdale, Rothbury and Kielder respectively (Hanson, 1952, p. 105).

In 1951 the forests at Grizedale, Lancashire; and at Greystoke and Thornthwaite, Cumberland; Tinnisburn, Dumfries-shire, were included in the survey. The sawfly populations in all areas except at Brecon seemed to be on the increase. This increase continued generally in 1952 (Crooke, 1953, p. 87).

During 1952 the survey was further expanded to include another 15 forests in south and east Scotland. Light infestations were noted in all plantations visited except in the south-west, where heavy infestations were noted, especially at Auchenroddan, Dumfries-shire (Crooke, 1954, p. 70).

From 1953 to 1955 fluctuations in the *P. erichsonii* populations continued. Though detectable, the fluctuations were very slight and appeared to be the normal condition found when any insect is studied intensively. The sawfly is found in most areas where there are larch plantations but in such small numbers that damage is negligible. However, the pure larch plantations created since the end of World War I are now providing suitable environments for possible sawfly outbreaks.

Encapsulation of eggs of *Mesoleius tenthredinis* by *P. erichsonii*

The ichneumonid *Mesoleius tenthredinis* Morley was introduced into Canada from England in 1910 and 1911 and was liberated in Ontario and Quebec to help in the control of the larch sawfly (Hewitt, 1912). These liberations were highly successful, and in 1912 additional liberations were made in Manitoba, where the percentage parasitism by *M. tenthredinis* increased from 19 in 1916 to 66 in 1920. By 1927, parasitism was sometimes as high as 88 per cent (Criddle, 1928).

Though *M. tenthredinis* continued to be very effective in the control of *P. erichsonii* in most areas where it had become established, by 1940 its effectiveness in Manitoba had greatly decreased (Muldrew, 1953). The cause of this decrease was the failure of most of the parasite eggs to hatch. Though high percentages of the sawfly larvae were parasitized by *M. tenthredinis,* the number of parasites that reached maturity and killed the hosts was very small and rarely exceeded five per cent. Dissections showed that the egg was prevented from hatching by being encased in a thick, translucent coating that was presumably laid down by the phagocytes of the host (Muldrew, 1953).

In 1955 larvae of *P. erichsonii* were collected in southern Scotland in the forests of Ae and Auchenroddan, Dumfries-shire, and of Fleet and Kirroughtree, Kirkcudbrightshire; and in the Lake District of England at Thirlmere, Cumberland. The larvae were permitted to

spin cocoons and were dissected periodically from October until the following February. Of 153 cocoons dissected, 83, or 54 per cent, were parasitized by *M. tenthredinis;* 24, or 29 per cent, of the parasite eggs were encapsulated and had not hatched. Thus the effective parasitism was reduced to 39 per cent.

Twenty-nine, or 19 per cent, of the larvae dissected contained encapsulated bodies other than parasite eggs. Most of these were spherical but some were irregular in shape. They ranged from pale orange to a coffee brown in colour and the largest encountered was 0.75 mm. in diameter. Because of the granular nature of the bodies when crushed, it was first thought that they might be bits of food material that had escaped from gut injuries. However, the chlorozinc-iodide test for cellulose gave negative results.

M. tenthredinis is the only parasite now known to attack *P. erichsonii* in Great Britain. Thus, the recent discovery that a high percentage of the parasite eggs become encapsulated and fail to hatch is important. As the effectiveness of this parasite was reduced from 88 per cent to less than five per cent in Canada, the future threat to the British larch seems very real.

Vespula vulgaris as a Predator of *P. erichsonii*

Attacks by wasps on larvae of insects, notably of Lepidoptera, have attracted the attention of gardeners and entomologists for many years. Less well known are attacks made by wasps on species of Hymenoptera. The following is apparently the first record of a wasp attacking *P. erichsonii* in Britain.

Vespula vulgaris (L.) was very numerous in the Lake District during the summer of 1954. At that time, at Thirlmere, the wasp killed and removed 38 sawfly larvae, or all the individuals in six clutches, in two days. During the summers of 1954 (21 observation hours) and 1955 (nine observation hours) 161 sawfly larvae were removed from the larch trees by the wasps in 180 visits.

When *V. vulgaris* is particularly numerous and when *P. erichsonii* is relatively scarce, as in 1954, the wasps may play an important part in control of the sawfly. In 1955, however, climatic conditions favoured rapid sawfly development and the larvae matured and left the trees two or three weeks before the wasps developed strong colonies.

Summary

The larch sawfly probably entered Britain from Europe and may have been established for many years before it was found there in the latter half of the nineteenth century. Larch was introduced as early as 1629. The first recorded outbreak occurred in Cumberland in 1904-1910. Subsequent surveys showed that the sawfly was present wherever larch was grown and that there was a severe outbreak in central Wales. By 1912 the larch trees were recovering from the sawfly attack and the sawfly became so rare that it was not observed

again until 1933. Since then the sawfly has been found in most areas where there are larch plantations, but in such small numbers that damage is negligible. The pure larch plantations created since the end of World War I are now providing environments suitable for larch sawfly outbreaks.

Though encapsulation of *M. tenthredinis* eggs by *P. erichsonii* has been known in Canada since 1940, the condition was unknown in the British sawfly population until 1955, when 29 per cent of the eggs of the parasite *Mesoleius tenthredinis* Morley that were examined were encapsulated, though 54 per cent of the larva in 153 cocoons were parasitized, only 39 per cent were killed by the parasite.

The sawfly larvae were preyed upon by *Vespula vulgaris* (L.), this apparently being the first record of a wasp attacking the larvae in Britain.

ACKNOWLEDGMENTS

I am grateful to Dr. M. Crooke and other officers of the Forestry Research Station, Alice Holt Lodge, Farnham, Surrey, for suggestions, for making their records available, and for supplying sawfly cocoons; to Mr. J. Edwards, Chief Forester of the Manchester Waterworks Commission, Thirlmere, for supplying first-hand knowledge, providing working space, and for allowing me complete freedom of the forests under his jurisdiction; to Mr. J. Hodgson, Thirlmere, for information of the sawfly outbreaks there; and to many foresters throughout England and Scotland for their assistance in providing maps, vehicles, and information.

REFERENCES

ANONYMOUS, 1910. The distribution of the larch sawfly in Great Britain. *J. Board Agr.,* **16**:981-991.

BAILEY, L. H., 1923. *The cultivated evergreens.* McMillan and Co., London.

CAMERON, P., 1885. A monograph of the British phytophagous Hymenoptera. Vol. **2.** *The Ray Society, London.*

CRIDDLE, N., 1928. The introduction and establishment of the larch sawfly parasite, *Mesoleius tenthredinis* Morley, into southern Manitoba (Hymen.). *Canad. Ent.,* **60**:51-53.

CROOKE, M., 1953. Forest entomology. *In* Report on forest research for the year ending March, 1952, pp. 87-88. *For. Comm., London.*

CROOKE, M., 1954. Forest entomology. *In* Report on forest research for the year ending March, 1953, pp. 70-74. *For. Comm., London.*

DALLIMORE, W. & JACKSON, A. B., 1931. *Handbook of Coniferae.* 2nd ed. Edward Arnold and Co., London.

GARDENER, R. C. B., 1952. New light on the introduction of larches. *Country Life,* **112**:1570-1571.

HANSON, H. S., 1951. Forest entomology. *In* Report on forest research for the year ending March, 1950, 83-91. *For. Comm., London.*

HANSON, H. S., 1952. Forest entomology. *In* Report on forest research for the year ending March, 1950, pp. 98-107. *For. Comm., London.*

HEWITT, C. G., 1912. The large larch sawfly (*Nematus erichsonii*), with an account of its parasites, other natural enemies and means of control. *Canada Dept. Agr. Bull.* 10 (2nd ser.) (Ent. Bull. 5).

MacDOUGALL, R. S., 1906. The large larch sawfly (*Nematus erichsonii*). *J. Board Agr.,* **13**:385-394.

MIDDLETON, T. H., 1914. Annual Report of the Horticultural Branch for the year 1913-14. *Board Agr. Fish., London.*

MITCHELL, A. F., 1954. Two old larches at Epsom. *Quart. J. For.*, **48**:293-296.

MULDREW, J. A., 1953. The natural immunity of the larch sawfly (*Pristiphora erichsonii* (Htg.)) to the introduced parasite *Mesoleius tenthredinis* Morley, in Manitoba and Saskatchewan. *Canad. J. Zoo.*, **31**:313-332.

NUTTALL, A. F., 1913. *Trees and how they grow.* The Waverly Book Co., London.

SMITH-HILL, J., 1907. A note on the sawfly attacking larch in Cumberland. *Quart. J. For.*, **1**:67-70.

THEOBALD, F. V. T., 1906. A larch sawfly in Cumberland. *Nature*, **74**:529-530.

WARDLE, R. A., 1914. Preliminary observations upon the life-histories of *Zenillia pexops* B. and B. and *Hypomblys albopictus* Grav. *J. Econ. Biol.*, **9**:85-103.

VANESSA ATALANTA L. (LEP., NYMPHALIDAE) IN FEBRUARY

The morning of 27th February 1960 being fine and sunny, I paid a visit to Kew Gardens, Surrey, with my daughter.

For several minutes we watched a Red Admiral butterfly (*V. atalanta*) flying vigorously and visiting blossoms of several species of heather (*Erica* spp.).

It would seem likely that this insect had survived the winter, which has thus far been comparatively mild in this part of the country.

In the part of Kew Gardens where we saw it are numerous coniferous and other non-deciduous trees, such as Holm Oak (*Quercus ilex*), which would provide suitable cover for hibernation.

E. W. CLASSEY.

Feltham, Middlesex.

[The Brimstone (*Gonepteryx rhamni*) and Small Tortoiseshell (*Aglais urticae*) were also observed on the same date at Byfleet, Surrey.—Ed.]

ON SOME PARASITIC *DIPTERA* AND *HYMENOPTERA* BRED FROM *LEPIDOPTEROUS* HOSTS

PART IV

MISCELLANEOUS RECORDS OF BRACONIDAE, ICHNEUMONIDAE AND EULOPHIDAE (HYM.)

By H. E. HAMMOND, F.R.E.S., AND KENNETH G. V. SMITH, M.I.Biol., F.R.E.S.

As in previous parts of this paper an asterisk (*) denotes a new host record for the parasite concerned.

HYMENOPTERA

Braconidae

Rogas irregularis (Wesm.) (det. J. F. Perkins). One female bred 10.iii.1953 from a larva of * *Leucania comma* L., Birmingham, Warwickshire (H.E.H.). The *Rogas* larva 'pupated' in the host larval skin 19.ix.1952.

Apanteles gracilariae Wilk. (det. G.E.J.N.). Several bred ix.1955 from larvae of *Gracillaria syringella* (F.) on privet, Oxford (K.G.V.S.).

Microgaster ? *hospes* Mshl. (det. G.E.J.N.). One bred 12.iv.1956 from a larva of * *Colocasia coryli* L. on beech, Tring. Herts (F. A. Noble). The parasite larva spun its cocoon 19.ix.1955. Morley and Rait Smith (1933 : 145) record an undetermined *Microgaster* sp. from this host.

Earinus nitidulus (Nees) (det. R.D.E.). One male and two females bred 18.iii.1951 from * *Atethmia xerampelina* Esp., Sussex (A. J. Wightman).

Macrocentrus marginator (Nees) (det. R.D.E.). One male bred 17.iv.1945 from *Aegeria culiciformis* L. and one female 26.iv.1945 from *Aegeria spheciformis* (Schiff.), both from Clowe's Wood, Warwickshire (H.E.H.).

Meteorus spp. One female bred 9.vi.1954 from * *Alcis repandata* L., Penmanmawr, Caernarvonshire (H.E.H.). The parasite pupated 4.v.1954. One male bred 29.vii.1955 from * *Ematurga atomaria* L., Kinlochewe, Ross (B. Hopkins). Parasite pupated 21.vii.1955.

Ichneumonidae

Listrodromus nycthemerus (Grav.) (det. J.F.P.). One male bred 7.vii.1951 from pupa of *Celastrina argiolus* L. on ivy, Wilmington, Kent (T. J. Honeybourne).

Aoplus (= *Stenichneumon*) *ratzburgi* Htg. (det. J.F.P.). One female bred 17.vi.1955 from a pupa of * *Thera obeliscata* Hb. on *Pinus sylvestris* L., Kinver, Staffordshire (H. T. King).

Cratichneumon nigritarius (Grav.) (det. J.F.P.). Four females bred 3.vi.1954 from pupae of *Bupalus piniaria* L., Cannock Chase, Staffs. (W. Bowater). One male bred 14.viii.1954 from *Bupalus piniaria*, Cannock Chase, Staffs. (K. G. V. Smith).

Platylalops (= *Barichneumon*) *pulchellatus* Br. (det. J.F.P.). One female bred early in May, 1955, from a pupa of * *Eupithecia palustraria* Dbld., Stoke Ferry, Kings Lynn, Norfolk (G. V. Day).

Ichneumon sp. (det. J.F.P.). One male bred 20.vi.1956 from *Polia nebulosa* Hufn., Cannock Chase, Staffs. (W. Bowater).

Amblyteles armatorius (Forst.). (det. K.G.V.S.). A male and female bred 13.ii.1957 and 4.v.1957 from pupae of *Triphaena pronuba* (L.), Fair Oak, Hants (P. H. Holloway).

Amblyteles palliatorius (Grav.) (det. J.F.P.). One male bred in 193~ from *Amathes ashworthii* Dbld., North Wales (G. E. L. Manley).

Platylabus transversus Bridg. (det. J.F.P.). One male and one female bred in June, 1958, from * *Perizoma sagittata* F., Stoke Ferry, Norfolk (G. V. Day).

Hypomecus quadriannulatus (Grav.) (det. J.F.P.). One male bred 2.v.1958 from pupa of * *Cosymbia albipunctata* Hufn. on birch, Nairnshire (F. A. Noble).

Agrothereutes saturniae (Boie) (det. J.F.P.). Several bred 26-30.vi.-1951 from *Saturnia pavonia* L., Cannock Chase, Staffs. (W. H. Scott and W. Bowater).

Pimpla instigator (F.) (det. K.G.V.S.). Two females bred in July, 1956, from pupae of *Papilio machaon* L., Hickling Broad, Norfolk (C. H. Hards). From 18 larvae of *machaon* collected only the two produced parasites. Several parasites have been recorded abroad for *P. machaon*, but the only previous British records appear to be *Dinotomus lapidator* F. (*vide* Morley and Rait-Smith, 1933 : 134) and *Pimpla aethiops* Curt. (*vide* Thompson, 1946 : 433). *P. instigator* has been bred from *machaon* in Germany (Thompson, *loc. cit.*). One female bred 1.v.1958 from *Apatele rumicis* L., Taunton, Somerset (G. E. L. Manley).

Itoplectis maculator (F.) (det. J.F.P.). One female bred 25.vi.1952 from *Cacoecia oporana* (L.) (= *podana* Scop.), Guilden Sutton, Cheshire (K. G. V. Smith).

Alloplasta murina (Grav.) (det. J.F.P.). A male and female bred 1.v.1925 from *Orthosia gracilis* Schiff. (one per host) on *Myrica gale* L., Kerry, Eire (A. J. Wightman).

Lampronota fulvipes Desv. (det. J.F.P.). One female bred 1957 from * *Sphecia bembeciformis* (Hübn.) in sallow, Stoke Ferry, Norfolk (G. V. Day).

Banchus femoralis Thoms. (det. J.F.P.). Two females bred 23.v.1951 and 3.vi.1951 from *Panolis flammea* Schiff. (one per host), Lancashire (T. J. Honeybourne). Parasites spun cocoons 28.vii.1950.

Labrorhycus flexorius (Thunb.) (det. J.F.P.). Two males and one female bred in July, 1958, from *Depressaria heracleana* L., Gloucester (R. S. George).

Campoplegidea angustatus Thoms. (det. J.F.P.). One male bred 25.viii. 1951 from *Bupalus piniaria* L., Cannock Chase, Staffs. (G. B. Manly).

Campoplegidea sp. (det. J.F.P.). One male bred 29.v.1956 from *Ematurga atomaria* L., Kinlochewe, Ross (H.E.H.). Parasite spun cocoon 5.viii.1955.

Campoletis (= *Sagaritopsis*) *punctata* Br. (det. J.F.P.). One female bred 4.iv.1953 from * *Mamestra persicariae* L., Pulborough, Sussex (A. J. Wightman). One male and three females bred 2.iv.1953 from *Plusia chryson* Esp., West Sussex (A. J. Wightman).

Campoletis maculipes Tschek. (det. G.J.K.). One female bred in July, 1952, from * *Cucullia chamomillae* Schiff., Pulborough, Sussex (A. J. Wightman).

Charops decipiens (Grav.) (det. J.F.P.). One male bred 24.vii.1953 from *Zygaena filipendulae* L., Warwickshire (W. Bowater).

Casinaria morionella Holmg. (det. J.F.P.). Several bred 29.vii.1951 from * *Eupithecia succenturiata* L. and *E. absinthiata* Cl., on wormwood (one per host), Birmingham (T. J. Honeybourne).

Casinaria moesta (Grav.) (det. J.F.P.). One male bred 14.vii.1951 from * *Earophila badiata* Schiff., Austy Wood, Warwickshire (H.E.H.). Parasite spun cocoon 27.vi.1951.

Casinaria spp. One female bred 28.v.1956 from *Alcis repandata* L., Cannock Chase, Staffs. (H. T. King). One female bred in August, 1953, from * *Ortholitha plumbaria* F., Sutton Park, Warwicks. (H.E.H.).

Phobocampe bicingulata (Grav.) (det. J.F.P.). One female bred in April, 1951, from * *Diataraxia oleracea* L., Birmingham (H.E.H.). Parasite spun cocoon 16.ix.1950. ? *P. bicingulata* female from *Apamea unanimis* Hb., July, 1953, Birmingham (H.E.H.).

Phobocampe spp. (det. J.F.P.). One female bred from *Drepana falcataria* L., Norfolk, Stoke Ferry (G. V. Day). One female bred 5.xi.1955 from * *Asphalia diluta* Schiff., Ham St., Kent (H.E.H.). Parasite spun cocoon 2.ix.1955. One male bred 10.iii.1953 from * *Calocalpe undulata* L., Cannock Chase, Staffs. (H.E.H.).

Spudastica kriechbaumeri (Bridg.) (det. J.F.P.). One female bred 14.iv.1952 from * *Orthosia cruda* Schiff. on oak, Austy Wood, Warwicks. (H.E.H.). Parasite pupated 18.iv.1951.

Campoplex (= *Omorgus*) sp. (det. J.F.P.). One male bred in July, 1952, from *Cacoecia lecheana* (L.), Guilden Sutton, Cheshire (K.G.V.S.).

Meloboris crassicornis (Grav.) (det. J.F.P.). One male bred 16.vii.1956 from *Hydraecia micacea* Esp. in potato stem, Shardlow, Derby (B. A. Cooper). Parasite spun cocoon 2.vii.1956.

Horogenes (= *Angitia*) spp. (det. J.F.P.). One male bred 14.v.1956 from *Hydriomena coerulata* F. on alder, Cannock Chase, Staffs. (F. A. Noble). Parasite spun cocoon 17.ix.1955. One female bred 2.vi.1954 from *Atethmia xerampelina* Esp. on *Fraxinus excelsior* L., Pulborough, Sussex (A. J. Wightman). Four males bred in July, 1958, from *Coleophora crocogramma* Zell., Gloucester (R. S. George).

Anilastus didymator (Thunb.) (det. J.F.P.). One male bred 24.ix.1954 from * *Anarta myrtilli* L., on heather, Kinver, Staffs. (H. T. King). Parasite spun cocoon 8.ix.1954. One male bred 26.ix.1953 from * *Lycophotia varia* Vill. on heather, Sutton Park, Warwicks. (H. T. King). Parasite spun cocoon 10.ix.1953. One female bred from * *Cucullia gnaphalii* Hb. on *Solidago virgaurea* L., Lewes, Sussex (A. J. Wightman).

Anilastus spp. (det. J.F.P.). One male bred 29.vi.1952 from a third instar larva of *Biston strataria* Hufn. on oak, Lyndhurst, Hants (H.E.H.). Parasite spun cocoon 21.vi.1952. One male bred 5.vi.1951 from *Hypena proboscidalis* L. on *Urtica dioica* L., Lynford, Norfolk H.E.H.). Parasite spun cocoon 25.v.1951.

Parabates tarsatus (Brischke) (det. J.F.P.). Two males bred 1957 from * *Anticollix sparsata* Tr. (one per host), Stoke Ferry, Norfolk (G. V. Day).

Mesochorus suecicus D.T. (det. J.F.P.). Two males bred 21.vi.1951 from *Abraxus grossulariata* L., on black currant, Birmingham (G. B. Manly). Parasites spun cocoons 26.v.1951.

Mesochorus sp. (det. J.F.P.). One female bred 13.vi.1951 from *Bupalus piniaria* L., Cannock Chase, Staffs. (G. B. Manly).

Dusonia falcator Thunb. (det. J.F.P.). One female bred 10.xi.1958. Parasite larva emerged early October from stunted last instar larva of *Phalera bucephala* L. and spun a black silk, woolly cocoon. *Phalera* larva was with about 15 unparasitized larvae feeding on elm at Begbroke, Oxon. The latter spun their own cocoons about the same time as the *Dusonia* larva (C. L. and S. T. C. Remington).

Eulophidae

Eulophus larvarum (L.) *f. nigribasis* Gradwell (det. G.R.G.). In Part III (p. 188) of this paper it was suggested that this may be a new species and it was subsequently described as such (Gradwell, 1957). However, from further study Mr. G. R. Gradwell has now shown that it is most probably an overwintering form of *E. larvarum* (vide Gradwell, 1958). We have one new host record for this species. Three females bred 11.iv.1957 from a larva of * *Amphipyra pyramidea* (L.) on oak, Sutton Park, Warwicks. (H.E.H.). Nine parasite larvae pupated 20.iv.1956, but only the three adults emerged.

ACKNOWLEDGMENTS

Once again we thank all those correspondents who have sent parasites or larvae from which we have subsequently bred parasites. For determinations of the Hymenoptera we thank Messrs. R. D. Eady, G. R. Gradwell, G. J. Kerrich, G. E. J. Nixon and J. F. Perkins, each acknowdedged individually in the text.

REFERENCES

ALLAN, P. B. M., 1949. *Larval Foodplants*. London.

GRADWELL, G. R., 1957. Hosts of three species of *Eulophus* Geoffroy (Hym., Chalcidoidea), one new to Science and another new to Britain *Ent. mon. Mag.*, **93**:140-142.

GRADWELL, G. R., 1958. *Eulophus nigribasis* Gradwell (Hym., Chalcidoidea) the overwintering form of *E. larvarum* (L.). *Ent. mon. Mag.*, **94**:234-235.

HAMMOND, H. E. & **SMITH, K. G. V.**, 1953. On some parasitic Diptera and Hymenoptera bred from Lepidopterous hosts. Part I, with a description of *Frontina laeta* Mg. (Dip.: Larvaevoridae). *Ent. Gaz.*, **4**:273-279.

1955. *Ditto* Part II, Misc. records of Phoridae, Larvaevoridae (Dipt.), Braconidae, Ichneumonidae and Eulophidae (Hym.). *Ent Gaz.*, **6**:168-174.

1957. *Ditto* Part III, Records of Tachinidae (Dipt.), Braconidae, Ichneumonidae, Encyrtidae, Pteromalidae, Eulophidae and Scelionidae (Hym.). *Ent. Gaz.*, **8**:181-189.

KLOET, G. S. & **HINCKS, W. D.**, 1945. *A Check-List of British Insects*. Stockport.

MORLEY, C. & **RAIT-SMITH, W.**, 1933. The Hymenopterous parasites of the British Lepidoptera. *Trans. R. ent. Soc. Lond.*, **81**:133-183.

THOMPSON, W. R., 1943—. A catalogue of the parasites and predators of insect pests. *Imp. Parasite Service*. Ontario, Canada.

WILKINSON, D. S., 1945. Description of Palearctic species of *Apanteles* (Hymen., Broconidae). *Trans. R. ent. Soc. Lond.*, **95**:35-226.

CALOPHASIA LUNULA HUFN. (LEP., NOCTUIDAE)

On the 29th July 1959, whilst on holiday in South Lancing, Sussex, I took one specimen of this moth at mercury vapour light. On the following night two more were taken in the same way.

All three insects were males, two in perfect condition and one slightly worn.

I trust that this record may help in the study of the life cycle of this interesting moth.

A. R. DAVEY.

Bucklebury, Berks.
Hillside, Hatch Lane,

REVISED INDEXED CHECK-LIST OF THE BRITISH LEPIDOPTERA

by I. R. P. HESLOP, M.A.

PART I

(*Continued from* Vol. 10, p.187)

Super-family NOCTUOIDEA

NOCTUIDAE
AGROTINAE

*271 **Actinotia polyodon** Clerck (*perspicillaris* L.) Purple Cloud

*272 **Euxoa cursoria** Hufn. Coast Dart

273 **Euxoa nigricans** L. Garden Dart

274 **Euxoa tritici** L. White-line Dart

275 **Euxoa subgothica** Haw. Gothic Dart

276 **Euxoa obelisca** Schiff. Square-spot Dart

*277 **Agrotis segetum** Schiff. Turnip Dart

278 **Agrotis vestigialis** Hufn. (*valligera* Schiff.) Archer Dart

279 **Agrotis crassa** Hübn. Great Dart

280 **Agrotis clavis** Hufn. (*corticea* Schiff.) Heart and Club

281 **Agrotis denticulatus** Haw. (*cinerea* auct.) Light Feathered Rustic

282 **Agrotis puta** Hübn. (*radius* Haw.) Shuttle-shaped Dart

283 **Agrotis trux** Hübn. Crescent Dart

284 **Agrotis spinifera** Hübn. Gregson's Dart

285 **Agrotis exclamationis** L. Heart and Dart

286 **Agrotis ipsilon** Hufn. (*suffusa* Schiff.) Dark Dart

287 **Agrotis ripae** Hübn. Sand Dart

288 **Agrotis flammatra** F. Black Collar

*289 **Lycophotia varia** Vill. (*strigula* Thunb.) True Lovers' Knot

*290 **Actebia praecox** L. Portland Dart

291 **Actebia fennica** Tausch. Eversman's Rustic

*292 **Peridroma porphyrea** Schiff. (*saucia* Hübn.) Pearly Underwing

*293 **Ammogrotis lucernea** L. Northern Rustic

*294 **Rhyacia simulans** Hufn. (*pyrophila* Schiff.) Dotted Rustic

*295 **Spaelotis ravida** Schiff. (*obscura* Brahm) Stout Dart

*296 **Coenophila subrosea** Steph.
Rosy Marsh

*297 **Graphiphora augur** F.
Double Dart

*298 **Diarsia brunnea** Schiff.
Purple Clay

299 **Diarsia mendica** F.
(*festiva* Schiff.)
Common Ingrailed Clay

300 **Diarsia conflua** Treits.
Lesser Ingrailed Clay

301 **Diarsia dahlii** Hübn.
Barred Chestnut Clay

302 **Diarsia rubi** View.
(*bella* Borkh.)
Small Square-spot

303 **Diarsia florida** Schmidt
Fen Square-spot

*304 **Ochropleura plecta** L.
Flame Shoulder

*305 **Amathes agathina** Dup.
Heath Rustic

306 **Amathes alpicola** Zett.
(*hyperborea* Zett.)
Northern Dart

307 **Amathes carnica** Her.
Mountain Rustic

308 **Amathes ashworthii** Doubl.
Ashworth's Rustic

309 **Amathes glareosa** Esp.
Autumnal Rustic

310 **Amathes castanea** Esp.
(*neglecta* Hübn.)
Grey Rustic

311 **Amathes baja** Schiff.
Dotted Clay

312 **Amathes depuncta** L.
Plain Clay

313 **Amathes c-nigrum** L.
Setaceous Hebrew-character

314 **Amathes ditrapezium** Schiff.
Triple-spotted Clay

315 **Amathes triangulum** Hufn.
Double Square-spot

316 **Amathes stigmatica** Hübn.
(*rhomboidea* Treits.)
Square-spotted Clay

317 **Amathes sexstrigata** Haw.
(*umbrosa* Hübn.)
Six-striped Rustic

318 **Amathes xanthographa** Schiff.
Square-spot Rustic

*319 **Axylia putris** L.
Flame Rustic

*320 **Anaplectoides prasina** Schiff.
(*herbida* Hübn.)
Green Arches

*321 **Eurois occulta** L.
Great Brocaded Rustic

*322 **Gypsitea leucographa** Schiff.
White-marked

*323 **Cerastis rubricosa** Schiff.
Red Chestnut Rustic

*324 **Naenia typica** L.
Gothic Type

NOCTUINAE

*325 **Mesogona acetosellae** Schiff.
Pale Stigma

*326 **Euschesis sobrina** Boisd.
Cousin-german

327 **Euschesis comes** Hübn.
(*orbona* F.)
Lesser Yellow-underwing

328 **Euschesis orbona** Hufn.
(*subsequa* Hübn.)
Lunar Yellow-underwing

329 **Euschesis janthina** Schiff.
Lesser-bordered Yellow-underwing

330 **Euschesis interjecta** Hübn.
Least Yellow-underwing

*331 **Noctua pronuba** L.
Common Yellow-underwing

*332 **Lampra fimbriata** Schreber (*fimbria* L.) Broad-bordered Yellow-underwing

HELIOTHINAE

*333 **Periphanes delphinii** L. Pease-blossom

*334 **Pyrrhia umbra** Hufn. (*marginata* F.) Bordered Orange

*335 **Heliothis viriplaca** Hufn. (*dipsacea* L.) Marbled Clover

336 **Heliothis maritima** Graslin Fulvous Clover

337 **Heliothis septentrionalis** Hoffmeyer Shoulder-striped Clover

338 **Heliothis scutosa** Schiff. Spotted Clover

339 **Heliothis nubigera** H.-S. Dorset Straw

340 **Heliothis peltigera** Schiff. Dark Bordered Straw

341 **Heliothis armigera** Hübn. Scarce Bordered Straw

ANARTINAE

*342 **Anarta myrtilli** L. Beautiful Yellow Underwing

343 **Anarta cordigera** Thunb. Dark Yellow Underwing

344 **Anarta melanopa** Thunb. Broad-bordered White Underwing

HADENINAE

*345 **Mamestra brassicae** L. Cabbage Dot

*346 **Melanchra persicariae** L. White Dot

*347 **Polia hepatica** Clerck (*tincta* Brahm) Silvery Arches

348 **Polia nitens** Haw. (*advena* Schiff.) Pale Shining Arches

349 **Polia nebulosa** Hufn. Grey Arches

*350 **Pachetra sagittigera** Hufn. (*leucophaea* View.) White-eared Gothic

*351 **Diataraxia oleracea** L. Bright-line Brown-eye

352 **Diataraxia essoni** Hamps. Esson's Gothic

*353 **Ceramica pisi** L. Broom Brocade

*354 **Hada nana** Hufn. (*dentina* Esp.) Light Shears

*355 **Scotogramma trifolii** Hufn. (*chenopodii* Schiff.) Small Nutmeg

*356 **Hadena blenna** Hübn. (*peregrina* Treits.) Stranger

357 **Hadena w-latinum** Hufn. (*genistae* Borkh.) Light Brocade

358 **Hadena suasa** Schiff. (*dissimilis* Knoch) Dog's-tooth

359 **Hadena thalassina** Hufn. Pale-shouldered Brocade

360 **Hadena contigua** Schiff. Beautiful Brocade

361 **Hadena bombycina** Hufn. (*glauca* Hübn.) Glaucous Shears

362 **Hadena dysodea** Schiff. (*chrysozona* Borkh.) Small Ranuncule

363 **Hadena bicolorata** Hufn. (*serena* Schiff.) Broad-barred White Gothic

364 **Hadena caesia** Schiff. Grey Coronet

365 **Hadena albimacula** Borkh.
White-spot Coronet

366 **Hadena conspersa** Schiff.
(*nana* Rott.)
Common Marbled Coronet

367 **Hadena compta** Schiff.
Varied Coronet

368 **Hadena bicruris** Hufn.
(*capsincola* Hübn.)
Lychnis Coronet

369 **Hadena barrettii** Doubl.
Barrett's Marbled Coronet

370 **Hadena rivularis** F.
(*cucubali* Schiff.)
Campion Coronet

371 **Hadena lepida** Esp.
(*carpophaga* Borkh.)
Tawny Shears

372 **Hadena capsophila** Dup.
Pod-lover

*373 **Anepia irregularis** Hufn.
(*echii* Borkh.)
Viper's Bugloss Gothic

*374 **Heliophobus albicolon** Hübn.
White Colon

375 **Heliophobus reticulata** Vill.
(*saponariae* Borkh.)
Bordered Gothic

*376 **Tholera popularis** F.
Feathered Gothic

377 **Tholera cespitis** Schiff.
Hedge Gothic

*378 **Cerapteryx graminis** L.
Antler

*379 **Graphania dives** Philpott
Maori Gothic

*380 **Xylomyges conspicillaris** L.
Silver Cloud

*381 **Brithys crini** F.
Kew Arches

ORTHOSIINAE

*382 **Orthosia gothica** L.
Common Hebrew Character

383 **Orthosia miniosa** Schiff.
Blossom Underwing

384 **Orthosia cruda** Schiff.
(*pulverulenta* Esp.)
Small Quaker

385 **Orthosia stabilis** Schiff.
Common Quaker

386 **Orthosia populeti** F.
Lead-coloured Drab

387 **Orthosia incerta** Hufn.
(*instabilis* Schiff.)
Clouded Drab

388 **Orthosia munda** Schiff.
Twin-spot Quaker

389 **Orthosia advena** Schiff.
(*opima* Hübn.)
Northern Drab

390 **Orthosia gracilis** Schiff.
Powdered Quaker

*391 **Panolis flammea** Schiff.
(*piniperda* Panz.)
Pine Beau

LEUCANIINAE

*392 **Meliana flammea** Curt.
Flame Wainscot

*393 **Leucania pallens** L.
Common Wainscot

394 **Leucania favicolor** Barr.
Mathew's Wainscot

395 **Leucania impura** Hübn.
Smoky Wainscot

396 **Leucania straminea** Treits.
Southern Wainscot

397 **Leucania pudorina** Schiff.
(*impudens* Hübn.)
Striped Wainscot

398 **Leucania obsoleta** Hübn.
Obscure Wainscot

399 **Leucania litoralis** Curt.
Shore Wainscot

400 **Leucania comma** L.
Shoulder-striped Wainscot

401 **Leucania putrescens** Hübn.
Devon Wainscot

402 **Leucania unipuncta** Haw.
White-speck Wainscot

403 **Leucania l-album** L.
White-L Wainscot

404 **Leucania vitellina** Hübn.
Delicate Wainscot

405 **Leucania loreyi** Dup.
Cosmopolitan Wainscot

406 **Leucania albipuncta** Schiff.
White-point Wainscot

407 **Leucania lythargyria** Esp.
Clay Wainscot

408 **Leucania conigera** Schiff.
Brown-line Wainscot

*409 **Mythimna turca** L.
Double-line Wainscot

NONAGRIINAE

*410 **Stilbia anomala** Haw.
Anomalous Wainscot

*411 **Rhizedra lutosa** Hübn.
(*crassicornis* Haw.)
Large Wainscot

*412 **Sedina buettneri** Her.
Blair's Wainscot

*413 **Arenostola pygmina** Haw.
(*fulva* Hübn.)
Small Wainscot

414 **Arenostola extrema** Hübn.
(*concolor* Guen.)
Concolorous Wainscot

415 **Arenostola fluxa** Hübn.
(*hellmanni* Ev.)
Mere Wainscot

416 **Arenostola morrisii** Dale
(*bondii* Knaggs)
Bond's Wainscot

417 **Arenostola elymi** Treits.
Lyme-grass Wainscot

418 **Arenostola brevilinea** Fenn
Fenn's Wainscot

419 **Arenostola phragmitidis** Hübn.
Fen Wainscot

*420 **Oria musculosa** Hübn.
Brighton Wainscot

*421 **Nonagria algae** Esp.
(*cannae* Ochs.)
Reed Wainscot

422 **Nonagria sparganii** Esp.
Webb's Wainscot

423 **Nonagria typhae** Thunb.
(*arundinis* F.)
Bulrush Wainscot

424 **Nonagria geminipuncta** Haw.
Twin-spot Wainscot

425 **Nonagria dissoluta** Treits.
Brown-veined Wainscot

426 **Nonagria neurica** Hübn.
(*edelsteni* Tutt)
Sussex Wainscot

*427 **Coenobia rufa** Haw.
(*despecta* Treits.)
Rufous Wainscot

*428 **Chilodes maritima** Tausch.
(*ulvae* Hübn.)
Silky Wainscot

CARADRININAE

*429 **Meristis trigrammica** Hufn.
(*trilinea* Schiff.)
Treble-line

*430 **Caradrina morpheus** Hufn.
Mottled Rustic

431 **Caradrina alsines** Brahm
Uncertain

432 **Caradrina blanda** Schiff.
(*taraxaci* Hübn.)
Smooth Rustic

433 **Caradrina ambigua** Schiff.
Vine's Rustic

434 **Caradrina superstes** Ochs.
(*blanda* Hübn.)
Powdered Fulvous

435 **Caradrina clavipalpis** Scop.
(*quadripunctata* F.)
Pale Mottled Willow

*436 **Laphygma exigua** Hübn.
Small Mottled Willow

APAMEINAE

*437 **Calamia tridens** Hufn.
(*virens* L.)
Claddagh

*438 **Dypterygia scabriuscula** L.
(*pinastri* L.)
Bird's-wing

*439 **Trachea atriplicis** L.
Orache Brocade

*440 **Prodenia litura** F.
Mediterranean Brocade

*441 **Apamea lithoxylaea** Schiff.
Common Light Arches

442 **Apamea sublustris** Esp.
Reddish Light Arches

443 **Apamea zollikoferi** Freyer
Scarce Arches

444 **Apamea monoglypha** Hufn.
(*polyodon* L.)
Dark Arches

445 **Apamea lateritia** Hufn.
Scarce Brindle

446 **Apamea epomidion** Haw.
(*hepatica* L.)
Large Clouded Brindle

447 **Apamea crenata** Hufn.
(*rurea* F.)
Cloud-bordered Brindle

448 **Apamea sordens** Hufn.
(*basilinea* Schiff.)
Rustic Shoulder-knot

449 **Apamea unanimis** Hübn.
Small Clouded Brindle

450 **Apamea pabulatricula** Brahm
(*connexa* Borkh.)
Union Rustic

451 **Apamea oblonga** Haw.
(*abjecta* Hübn.)
Crescent Striped

452 **Apamea infesta** Ochs.
(*sordida* Borkh.)
Large Nutmeg

453 **Apamea furva** Schiff.
Confused Brindle

454 **Apamea remissa** Hübn.
(*obscura* Haw.)
Dusky Brocade

455 **Apamea scolopacina** Esp.
Slender Brindle

456 **Apamea secalis** L.
(*didyma* Esp.)
Common Rustic

457 **Apamea ophiogramma** Esp.
Double-lobed

458 **Apamea ypsillon** Schiff.
(*fissipuncta* Haw.)
Dismal Brindle

459 **Apamea exulis** Lef.
Exile Arches

460 **Apamea assimilis** Doubl.
Northern Arches

*461 **Eremobia ochroleuca** Schiff.
Dusky Sallow Rustic

*462 **Procus strigilis** Clerck
Marbled Minor

463 **Procus latruncula** Schiff.
Tawny Minor

464 **Procus versicolor** Borkh.
Rufous Minor

465 **Procus fasciuncula** Haw.
Middle-barred Minor

466 **Procus literosa** Haw.
Rosy Minor

467 **Procus furuncula** Schiff.
(*bicoloria* Vill.)
Cloaked Minor

*468 **Phothedes captiuncula** Treits.
(*expolita* Staint.)
Least Minor

*469 **Luperina testacea** Schiff.
Flounced Rustic

470 **Luperina nickerlii** Freyer
Guenée's Sandhill Rustic

471 **Luperina dumerilii** Dup.
Dumeril's Pale-feathered Rustic

*472 **Euplexia lucipara** L.
Small Angle-shades

*473 **Phlogophora meticulosa** L.
Large Angle-shades

*474 **Eriopus juventina** Cram.
Latin

*475 **Hyppa rectilinea** Esp.
Saxon

*476 **Thalpophila matura** Hufn.
(*cytherea* F.)
Straw Underwing

AMPHIPYRINAE

*477 **Acosmetia caliginosa** Hübn.
Reddish Buff

*478 **Petilampa minima** Haw.
(*arcuosa* Haw.)
Small Dotted Buff

*479 **Hapalotis venustula** Hübn.
Rosy Marbled

*480 **Hydrillula palustris** Hübn.
Marsh Buff

*481 **Celaena haworthii** Curt.
Haworth's Crescent

482 **Celaena leucostigma** Hübn.
(*fibrosa* Hübn.)
Brown Crescent

*483 **Perigea conducta** Walk.
African

*484 **Hydraecia oculea** L.
(*nictitans* Borkh.)
Common Ear

485 **Hydraecia paludis** Tutt
Saltern Ear

486 **Hydraecia lucens** Freyer
Large Ear

487 **Hydraecia crinanensis** Burr.
Crinan Ear

*488 **Gortyna micacea** Esp.
Rosy Ear

489 **Gortyna petasitis** Doubl.
Butterbur Ear

490 **Gortyna flavago** Schiff.
(*ochracea* Hübn.)
Orange Ear

491 **Gortyna hucherardi** Mab.
Giant Ear

*492 **Dicycla oo** L.
Heart Pinion

*493 **Cosmia pyralina** Schiff.
Lunar-spotted Pinion

494 **Cosmia affinis** L.
Lesser-spotted Pinion

495 **Cosmia diffinis** L.
White-spotted Pinion

496 **Cosmia trapezina** L.
Dun-bar

*497 **Enargia paleacea** Esp.
(*fulvago* Hübn.)
Angle-striped

498 **Enargia ulicis** Staud.
Berber

*499 **Zenobia retusa** L.
Double Kidney

500 **Zenobia subtusa** Schiff.
Olive Kidney

*501 **Panemeria tenebrata** Scop.
(*arbuti* F.)
Small Yellow Underwing

*502 **Amphipyra pyramidea** L.
Copper Underwing

503 **Amphipyra tragopoginis** Clerck
Mouse

*504 **Rusina tenebrosa** Hübn.
(*umbratica* auct.)
Brown Feathered

*505 **Mormo maura** L.
Old-lady

APATELINAE

*506 **Cryphia perla** Schiff.
Marbled Beau

507 **Cryphia muralis** Forst.
(*par* Hübn.)
Marbled Vert

508 **Cryphia impar** Warren
Marbled Cantab

509 **Cryphia degener** Schiff.
(*algae* F.)
Marbled Tree-lichen

510 **Cryphia divisa** Esp.
(*raptricula* Hübn.)
Marbled Gris

*511 **Moma alpium** Osbeck
(*orion* Esp.)
Scarce Merveille-du-jour

*512 **Apatele leporina** L.
Miller

513 **Apatele aceris** L.
Sycamore Dagger

514 **Apatele megacephala** Schiff.
Poplar Dagger

515 **Apatele alni** L.
Alder Dagger

516 **Apatele strigosa** Schiff.
Marsh Dagger

517 **Apatele tridens** Schiff.
Dark Dagger

518 **Apatele psi** L.
Grey Dagger

519 **Apatele cuspis** Hübn.
Large Dagger

520 **Apatele menyanthidis** View.
Light Knot-grass Dagger

521 **Apatele auricoma** Schiff.
Scarce Dagger

522 **Apatele euphorbiae** Schiff.
Sweet-gale Dagger

523 **Apatele rumicis** L.
Dusky Knot-grass Dagger

*524 **Craniophora ligustri** Schiff.
Crown

*525 **Simyra venosa** Borkh.
(*albovenosa* auct.)
Powdered Dagger

CUCULLIINAE

*526 **Cucullia lactucae** Schiff.
Lettuce Shark

527 **Cucullia umbratica** L.
Common Shark

528 **Cucullia asteris** Schiff.
Starwort Shark

529 **Cucullia chamomillae** Schiff.
Chamomile Shark

530 **Cucullia gnaphalii** Hübn.
Cudweed Shark

531 **Cucullia absinthii** L.
Pale Wormwood Shark

532 **Cucullia artemisiae** Hufn.
Scarce Wormwood Shark

533 **Cucullia verbasci** L.
Mullein Shark

534 **Cucullia scrophulariae** Schiff.
Water Betony Shark

535 **Cucullia lychnitis** Ramb.
Striped Lychnis Shark

536 **Cucullia argentea** Hufn.
Green Silver-spangled Shark

XYLENINAE

*537 **Lithomoia solidaginis** Hübn.
Bilberry Brind

*538 **Lithophane semibrunnea** Haw.
Tawny Pinion

539 **Lithophane socia** Hufn.
(*petrificata* F.)
Pale Pinion

540 **Lithophane leautieri** Boisd.
Blair's Pinion

541 **Lithophane furcifera** Hufn.
(*conformis* F.)
Conformist

542 **Lithophane lamda** F.
Nonconformist

543 **Lithophane ornitopus** Hufn.
(*rhizolitha* F.)
Grey Shoulder-knot

*544 **Xylena exsoleta** L.
Cloudy Sword-grass

545 **Xylena vetusta** Hübn.
Red Sword-grass

*546 **Xylocampa areola** Esp.
(*lithorhiza* Borkh.)
Grey Early

DASYPOLIINAE

*547 **Calophasia lunula** Hufn.
(*linariae* Esp.)
Toadflax Brocade

548 **Calophasia platyptera** Esp.
Antirrhinum Brocade

*549 **Leucochlaena hispida** Gey.
(*oditis* Hübn.)
Beautiful Goth

*550 **Brachionycha sphinx** Hufn.
(*cassinia* Schiff.)
Common Sprawler

551 **Brachionycha nubeculosa** Esp.
Rannoch Sprawler

*552 **Bombycia viminalis** F.
Minor Shoulder-knot

*553 **Aporophyla lutulenta** Schiff.
Deep Brown Rustic

554 **Aporophyla lunebergensis** Freyer
Glossy Dark Rustic

555 **Aporophyla lunula** Stroem
(*nigra* Haw.)
Black Rustic

556 **Aporophyla australis** Boisd.
Feathered Brindle

*557 **Allophyes oxyacanthae** L.
Green-brindled Crescent

*558 **Meganephria bimaculosa** L.
Double-spot Brocade

*559 **Griposia aprilina** L.
Common Merveille-du-jour

*560 **Trigonophora flammea** Esp.
(*empyrea* Hübn.)
Flame Brocade

*561 **Eumichtis satura** Schiff.
(*porphyrea* Esp.)
Beautiful Arches

562 **Eumichtis adusta** Esp.
Dark Brocade

563 **Eumichtis lichenea** Hübn.
Feathered Ranuncule

*564 **Parastichtis suspecta** Hübn.
Suspected

*565 **Dryobotodes eremita** F.
(*protea* Schiff.)
Brindled Green Mottle

*566 **Synvaleria oleagina** Schiff.
Green Brindled Dot

*567 **Dasypolia templi** Thunb.
Brindled Ochre

*568 **Antitype flavicincta** Schiff.
Large Ranuncule

569 **Antitype chi** L.
Grey Chi

570 **Antitype xanthomista** Hübn.
(*nigrocincta* Treits.)
Black-banded

*571 **Eupsilia transversa** Hufn.
(*satellitia* L.)
Satellite

*572 **Jodia croceago** Schiff.
Orange Upperwing

*573 **Dasycampa rubiginea** Schiff.
Dotted Chestnut

*574 **Omphaloscelis lunosa** Haw.
Lunar Underwing

*575 **Agrochola lota** Clerck
Red-line Quaker

576 **Agrochola macilenta** Hübn.
Yellow-line Quaker

577 **Agrochola circellaris** Hufn.
(*ferruginea* Esp.)
Brick

578 **Agrochola lychnidis** Schiff.
(*pistacina* F.)
Beaded Chestnut

*579 **Anchoscelis helvola** L.
(*rufina* L.)
Flounced Chestnut

580 **Anchoscelis litura** L.
Brown-spot Chestnut

*581 **Atethmia xerampelina** Esp.
Centre-barred Sallow

*582 **Tiliacea citrago** L.
Orange Sallow

583 **Tiliacea aurago** Schiff.
Barred Sallow

*584 **Citria lutea** Stroem
(*flavago* F.)
Pink-barred Sallow

*585 **Cirrhia icteritia** Hufn.
(*fulvago* L.)
Common Sallow

586 **Cirrhia gilvago** Schiff.
Dusky-lemon Sallow

587 **Cirrhia palleago** Hübn.
Dusky-orange Sallow

588 **Cirrhia ocellaris** Borkh.
Pale-lemon Sallow

*589 **Conistra erythrocephala** Schiff.
Red-headed Chestnut

590 **Conistra vaccinii** L.
Common Chestnut

591 **Conistra ligula** Esp.
(*spadicea* Staint.)
Dark Chestnut

HYLOPHILIDAE

WESTERMANNIINAE

*592 **Bena prasinana** L.
(*fagana* F.)
Green Silver-lines

*593 **Pseudoips bicolorana** Fuessl.
(*quercana* Schiff.)
Scarce Silver-lines

*594 **Earias clorana** L.
Cream-bordered Green

NYCTEOLINAE

*595 **Nycteola revayana** Scop.
(*undulana* Hübn.)
Large Marbled Tort

596 **Nycteola degenerana** Hübn.
Sheldon's Sallow Tort

PLUSIIDAE

EUSTROTIINAE

*597 **Emmelia trabealis** Scop.
(*sulphuralis* L.)
Spotted-sulphur

*598 **Tarache lucida** Hufn.
(*solaris* Schiff.)
Pale Shoulder

599 **Tarache aprica** Hübn.
Nun

*600 **Eublemma ostrina** Hübn.
Purple Marbled

601 **Eublemma parva** Hübn.
Small Marbled

602 **Eublemma noctualis** Hübn.
(*paula* Hübn.)
Scarce Marbled

*603 **Lithacodia fasciana** L.
White-spot Marbled

604 **Lithacodia deceptoria** Scop.
Pretty Marbled

*605 **Eustrotia bankiana** F.
(*olivana* Schiff.)
Silver Bars

606 **Eustrotia uncula** Clerck
(*uncana* L.)
Silver Hook

*607 **Synthymia fixa** F.
(*monogramma* Hübn.)
Goldwing

CATOCALINAE

*608 **Catocala fraxini** L.
Clifden Nonpareil

609 **Catocala electa** View.
Rosy Underwing

610 **Catocala nupta** L.
Red Underwing

611 **Catocala sponsa** L.
Dark Crimson Underwing

612 **Catocala promissa** Schiff.
Light Crimson Underwing

*613 **Minucia lunaris** Schiff.
Lunar Double-stripe

*614 **Grammodes stolida** F.
Geometrician

*615 **Euclidimera mi** Clerck
Mother Shipton

*616 **Ectypa glyphica** L.
Burnet Companion

PANTHEINAE

*617 **Colocasia coryli** L.
Nut-tree Tuffet

*618 **Charadra deridens** Guen.
Marbled Tuffet

*619 **Episema caeruleocephala** L.
Figure of Eight

PLUSIINAE

*620 **Telesilla amethystina** Hübn.
Cumberland Gem

*621 **Polychrisia moneta** F.
Silver Eight

*622 **Plusia variabilis** Piller
(*illustris* F.)
Purple-shaded Gem

623 **Plusia chrysitis** L.
Common Burnished Brass

624 **Plusia orichalcea** F.
(*aurifera* Hübn.)
Slender Burnished Brass

625 **Plusia chryson** Esp.
(*orichalcea* auct. *nec* F.)
Scarce Burnished Brass

626 **Plusia bractea** Schiff.
Gold Spangle

627 **Plusia festucae** L.
Gold Spot

628 **Plusia biloba** Steph.
Stephens's Gem

629 **Plusia chalcites** Esp.
(*eriosoma* Doubl.)
Golden Twin-spot

630 **Plusia jota** L.
Plain Golden Y

631 **Plusia pulchrina** Haw.
Beautiful Golden Y

632 **Plusia ni** Hübn.
(*brassicae* Ril.)
Silver V

633 **Plusia limbirena** Guen.
Scarbank Gem

634 **Plusia confusa** Steph.
(*gutta* Guen.)
Dewick's Silver Spangle

635 **Plusia gamma** L.
Common Silver Y

636 **Plusia interrogationis** L.
Scarce Silver Y

637 **Plusia acuta** Walk.
Tunbridge Wells Gem

*638 **Unca triplasia** L.
Dark Spectacle

639 **Unca tripartita** Hufn.
(*urticae* Hübn.)
Light Spectacle

OPHIDERINAE

*640 **Catephia alchymista** Schiff.
Alchymist

*641 **Acontia luctuosa** Schiff.
Four-spot

642 **Acontia catena** Sowerby
Brixton Beauty

*643 **Tathorhynchus exsiccata Led.**
Levant Blackneck

*644 **Lygephila pastinum** Treits.
Plain Blackneck

645 **Lygephila craccae** Schiff.
Scarce Blackneck

*646 **Raphia frater** Grote
Brother

*647 **Colobochyla salicalis** Schiff.
Belle Point

*648 **Rivula sericealis** Scop.
Straw Point

*649 **Phytometra viridaria** Clerck
(*aenea* Hübn.)
Small Purple Bars

*650 **Parascotia fuliginaria** L.
Waved Black

GONOPTERINAE

*651 **Scoliopteryx libatrix** L.
Herald

HYPENINAE

*652 **Bomolocha fontis** Thunb.
(*crassalis* Treits.)
Beautiful Snout

*653 **Hypena proboscidalis** L.
Common Snout

654 **Hypena obsitalis** Hübn.
Bloxworth Snout

655 **Hypena obesalis** Treits.
Stout Snout

656 **Hypena rostralis** L.
Buttoned Snout

*657 **Schrankia taenialis** Hübn.
(*albistrigalis* Haw.)
White-line Snout

658 **Schrankia costaestrigalis**
Steph.
Pinion-streaked Snout

*659 **Hypenodes turfosalis** Wocke
Marsh Oblique-barred Snout

*660 **Trisateles emortualis** Schiff.
Olive Crescent Snout

*661 **Zanclognatha tarsipennalis**
Treits.
Brown Fanfoot

662 **Zanclognatha nemoralis F.**
(*grisealis* Schiff.)
Small Fanfoot

663 **Zanclognatha cribrumalis**
Hübn.
(*cribralis* Hübn.)
Dotted Fanfoot

*664 **Paracolax derivalis** Hübn.
Clay Fanfoot

*665 **Herminia barbalis** Clerck
Common Fanfoot

*666 **Laspeyria flexula** Schiff.
Beautiful Hook-wing

To be continued.

Published 4th May, 1960.